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ABSTRACT

This report responds to requirements of Section 508 of the Rehabilitation Act, as amended in 1998, concerning the accessibility of federal electronic and information technology to individuals with disabilities. It contains the results of the first executive branch-wide Section 508 evaluation and recommends specific inexpensive, cost-effective, and easily accomplishable measures to improve technology accessibility. General recommendations include increased interagency coordination concerning accessibility and provision of technical assistance to agencies. Recommendations concerning procurement include: specific language in requests for proposals and contracts concerning technology accessibility and development of systematic procurement procedures that ensure accessibility. Technology-specific findings and recommendations are offered for the following areas: (1) federal agencies' Web pages; (2) software; (3) telecommunications; (4) kiosks and other information transaction machines; and (5) fax machines, copiers, printers, and other information technology office equipment. (DB)

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ED 450 514

# *Information Technology and People with Disabilities: The Current State of Federal Accessibility*

**Presented by**
**The Attorney General**
**to**
**The President of the United States**

*April 2000*

EC 308271

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# Executive Summary & Recommendations[1]

## Introduction

Prior to the late 1980's, computers were generally easy for most people with disabilities to use. People who were blind, for example, could use the same word processing software packages as everyone else. Instead of relying on monitors, they used assistive technology — called "screen readers" — to read in a synthesized voice all the text and punctuation that a sighted person would read on the computer monitor. All who used early word processors used keyboard commands to interact with the software. To print a document, for instance, one would simultaneously hit the "control" and "P" keys — something that could be done as easily by blind people as others.

As technology grew more sophisticated, many changes that generally made it easier for nondisabled people to use computers often created barriers for people with disabilities. For instance, software that required someone to issue commands by "pointing and clicking" using a computer mouse became inaccessible to those who could not see icons. Although the solutions were simple and inexpensive, little thought was given to preserving accessibility. For example, if word processing software allows the user to choose between entering "control-P" to print or clicking on a printer icon, then blind people can use the print function as easily as everyone else.

In the past, most agencies did not focus on the extent to which their mainstream technology was accessible to persons with disabilities. Some employees with disabilities lost jobs or became underemployed due to technological advances that unfairly screened them out from the workplace, even when they otherwise had the skills, intelligence, and knowledge to accomplish their jobs.

## Section 508 of the Rehabilitation Act

An amendment to section 508, signed by President Clinton in August 1998, requires the Attorney General to report to the President on accessibility of federal electronic and information technology (EIT) — such as federal Web sites, telecommunications, software, hardware, printers, fax machines, copiers, and information kiosks — to people with disabilities. Section 508 of the Rehabilitation Act, 29 U.S.C. § 794d, as amended.

Section 508 prohibits federal agencies from procuring, developing, maintaining, or using EIT that is inaccessible to people with disabilities, subject to an undue burden defense. "Undue burden" generally means a significant difficulty or expense.

On March 31, 2000, the Architectural and Transportation Barriers Compliance Board (Access Board) published a Notice of Proposed Rulemaking containing draft accessibility standards to implement section 508. 65 Fed. Reg. 17346. Once final, these Standards will be incorporated into the Federal Acquisition Regulation (FAR), to which most agencies are subject. Agencies not covered by the FAR will incorporate the Access Board's Section 508 Standards into their own procurement regulations.

The General Services Administration (GSA) and the Access Board share statutory authority to provide section 508 technical assistance. 29 U.S.C. § 794d(b).

Although the law technically applies to federal agencies' existing EIT, by its own terms it is unenforceable except for products procured on or after August 7, 2000; retroactive modification of existing EIT is not required. Agencies continue to have long-standing obligations under sections 501 and 504 of the Rehabilitation Act to provide reasonable accommodations to qualified individuals with disabilities (including members of the public and federal employees) upon request and to avoid disability-based discrimination, generally. 29 U.S.C. §§ 791, 794. Agencies must comply with section 508 regardless of whether they have employees with disabilities or serve members of the public with disabilities.

Built-in assistive technology is not required where it is not needed. Section 508 does not require every workstation or every EIT product to be fully accessible to persons with disabilities. Products like desktop computers do not have to be outfitted with refreshable Braille displays;[2] rather they must be compatible with refreshable Braille displays, so that if an individual who is blind needs one as a reasonable accommodation, he or she can use it with the agency's standard workstations. Section 508 does not require private companies who market EIT products to the Federal Government to modify the EIT products used by company employees, or to make the companies' own Internet sites accessible to people with disabilities. For instance, if a manufacturer wishes to sell desktop computers to federal agencies, it must ensure that these computers comply with the Access Board's Section 508 Standards or agencies will be unable to purchase them. The company telecommunications systems, Internet pages, and other EIT used by company employees (including desktop computers not intended for federal use), are not subject to section 508.

The Department of Justice is not charged with enforcing section 508. Members of the public and employees with disabilities, however, may:

- file administrative complaints with agencies they believe to be in violation of section 508; or
- file private lawsuits in Federal district court.

29 U.S.C. § 794d(f).

In August 2001 and every 2 years thereafter, the Attorney General is required to provide updated reports to the President and Congress. These subsequent reports will discuss improvements in the degree of accessibility of federal EIT and will also report on the resolution of section 508 complaints filed against federal agencies. 29 U.S.C. § 794d(d).

## The Report

The Department of Justice's Civil Rights Division has prepared this Report. It contains the results of the first Executive Branch-wide section 508 evaluation. It also recommends specific inexpensive, cost-effective, and easily accomplishable measures to improve the extent to which federal agencies' technology is accessible to people with disabilities. By following these recommendations, agencies will facilitate their compliance with the general nondiscrimination and reasonable accommodation requirements of sections 501 and 504 of the Rehabilitation Act. The Department's recommendations make the most of existing resources and build upon model agency practices.

The Report is intended to provide guidance to:

- federal information technology personnel, policy makers, and procurement officials,
- private sector technology designers, manufacturers, and vendors, and
- disability advocates.

## History of the Department of Justice's Efforts

In April 1999, the Attorney General sent a package of detailed self-evaluation materials and resource guides to federal agencies and departments, including the U.S. Postal Service, to assist them with accomplishing meaningful section 508 self-evaluations. Agencies were instructed to evaluate their procurement policies and practices, telecommunications products and systems, and their most commonly used Internet pages, software applications, information kiosks and other information transaction machines, and other electronic office equipment such as fax machines, copiers, and printers. Products were generally evaluated in 2 ways:

- using objective checklist-style questions, and
- using more subjective evaluation techniques, such as consulting with people with disabilities and viewing Internet pages with text-only browsers and other types of assistive technology.

To create this Report, the Department collected objective survey data from 81 agencies, including over 250 components, on an interactive Internet database site. A list of these agencies is attached as General Appendix A (Categories of Agencies). Subjective "overall agency evaluations" were also provided to the Department.

The Department established a section 508 home page (http://www.usdoj.gov/crt/508) to make available to a wide audience the Department's section 508 resource guides and self-evaluation material. Federal and state agencies, the technology industry, and disability advocates regularly use this web site. From the week ending April 12, 1999, through the week ending March 13, 2000, we recorded 201,432 "hits" on this site.

For the last 18 months, representatives of the Department of Justice have met with countless agencies to help them understand the importance of section 508 and to assist them with their self-evaluations.

This Report would not have been possible without assistance from the Department of Education, the General Services Administration, the Federal Communications Commission, and other agencies. The Department also learned from private sector leaders in the field of technology accessibility, including the World Wide Web Consortium's Web Accessibility Initiative and the University of Wisconsin's Trace Center.

## General Findings and Recommendations

While several agencies are models of accessibility, the data suggest the need for improvement in the accessibility of federal EIT to persons with disabilities. Most agencies can also improve the extent to which disability accessibility issues are incorporated into their mainstream technology procurement contracts.

The most significant challenge posed by section 508 is the need for coordination between those with technological expertise and those with knowledge of disability access issues. The rapid pace of technology innovation can further complicate the issue. Increased inter- and intra-agency coordination among relevant personnel — including information technology personnel, procurement officials, telecommunications staff, equal employment opportunity professionals, and end users with disabilities — along with the private sector, would benefit everyone.

For increased coordination and cooperation to be efficient and effective, the Department recommends the following:

## Increased Coordination

1. The President should issue a *Technology Accessibility Coordination Directive* to:

a. Revitalize the Interagency Disability Coordinating Council (IDCC), as set forth in 29 U.S.C. § 794c, with the Attorney General as Chair, consistent with Executive Order 12250, 29 U.S.C. § 2000d-1;[3]

b. Direct certain Federal agencies (including the General Services Administration, the Department of Defense, and the Department of Transportation), and invite other agencies (including the Federal Communications Commission and the U.S. Postal Service) to participate as nonstatutory members in the IDCC; and

c. Direct the Department of Justice, in consultation with the Office of Personnel Management, the EEOC, and the Access Board, to issue guidance to agencies clarifying the relationship among sections 501, 504, and 508 of the Rehabilitation Act.

2. The Universal Access Working Group (UAWG).[4] Each cabinet level, large, and mid-sized agency, along with representatives from small and very small agencies, should join the inter-agency UAWG. See General Appendix A (Categories of Agencies). The UAWG has been an instrumental force in advocating for accessible technology throughout the Federal Government and private sector. Its relevance would be increased if its members were designated as their agencies' representatives, rather than participating as individual volunteers, and if more agencies were involved.

3. 508 Coordinators. Each agency should designate Coordinators for purposes of complying with the substantive and reporting requirements of section 508. Agencies should either select multiple Coordinators -- to represent each of the agency's information technology, telecommunications, disability accommodations, and other relevant sectors -- or a single representative to act as an intermediary among these sectors. The Section 508 Coordinators of cabinet level, large, and mid-sized agencies, along with representatives from small and very small agencies, should attend UAWG

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meetings as representatives of their agencies. See General Appendix A (Categories of Agencies). A list of all Section 508 Coordinators should be developed and distributed among all agencies. The Section 508 Coordinators should meet regularly with agencies' Section 504 Coordinators.

## Technical Assistance

1. The General Services Administration (GSA) and the Access Board, which have statutory authority for providing technical assistance under section 508, should share in the following responsibilities:

a. Information Hotline. An information hotline should be established for federal agencies, persons with disabilities, and the IT industry. The Department of Justice's Americans with Disabilities Act Information Line should serve as a model.

b. Technical Support Center. An interagency technical assistance support center should be established where agencies can receive specific, hands-on assistance tailored to their individual concerns. The Job Accommodation Network of the President's Committee on Employment of Persons with Disabilities at the Department of Labor should serve as a model.

c. Internet Resources. An Internet message board and listserv (an e-mail mailing list for discussion among a group of users) should be maintained where knowledgeable agencies can post solutions to particular problems and where agencies trying to address EIT accessibility issues can post questions. Agencies that have developed evaluation criteria, techniques, and reports of existing EIT products should make these available to other agencies using these Internet resources [recommendation of the Social Security Administration].

2. GSA should do the following:

a. Accessible Products Clearinghouse. GSA should be directed to act as a clearinghouse for information regarding accessible EIT products. Any manufacturer's information regarding accessibility of EIT products should be made available to all federal contract officers and their technical representatives through this Clearinghouse. The Energy Star and Y2K programs may provide models on which to build.

b. Training Clearinghouse. A clearinghouse for accessible training resources — and training regarding accessibility — for management, IT and procurement personnel, and end users with disabilities should be established. Vendor information regarding accessible training opportunities should be made available to all agencies through this Clearinghouse.

3. Mechanism for Reliable Information. The Federal Government, in partnership with the private sector, should explore the best mechanism to provide reliable information (including information regarding the comparative usability of EIT products for people with different types of disabilities) to manufacturers, vendors, and procurement officials.

## Other General Implementation Recommendations

1. Alternative Dispute Resolution. Each agency should establish voluntary alternative dispute resolution mechanisms and make them available to members of the public and employees with disabilities as a means to resolve allegations that an agency is violating section 508.

2. Other Government Certification Programs. Government programs which test and certify software for federal use (such as the JFMIP certification of financial management applications) should incorporate Section 508's accessibility requirements into their certification processes [recommendation of the Equal Employment Opportunity Commission].

3. Voluntary Advisory Committees of Persons with Disabilities. Each cabinet level, large, and mid-sized agency that has not already done so should form an intra-agency voluntary advisory committee of persons with disabilities. See General Appendix A (Categories of Agencies). Small and very small agencies are encouraged to form joint inter-agency committees. These committees can assist agencies in recognizing accessibility issues, finding cost-effective solutions, and accomplishing testing. Participation by people with disabilities in all such committees should be fully voluntary. The Equal Employment

Opportunity Commission and the Office of Personnel Management should collaboratively publish guidance to assist agencies with setting up these committees.

4. Community Partnerships. Each agency is encouraged to form partnerships with disability rights groups. These partnerships can assist agencies with recognizing accessibility issues, finding solutions, and accomplishing testing.

## Procurement Findings and Recommendations

Section 508's enforcement provisions apply only to EIT products "procured" on or after August 7, 2000. The Access Board's Standards to implement section 508 will be incorporated into the Federal Acquisition Regulation (FAR). Most agencies are subject to the FAR. Some others follow it voluntarily. The few remaining agencies, including the U.S. Postal Service, will be required to modify their procurement regulations to incorporate the 508 Standards.

Relatively few agencies currently incorporate accessibility provisions into their EIT procurement contracts (several of the better contract provisions have been incorporated into this Report to serve as models for other agencies; see, e.g., The Department of Education's contract language, attached as Procurement Appendix B). Even fewer agencies test EIT products for accessibility prior to bid acceptance. A great majority of agencies continue to address EIT accessibility issues on an ad hoc basis.

The Department recommends agencies take the following steps to improve their procurement policies and practices:

1. Specific Language for RFPs and Contracts. Each agency should incorporate appropriate procurement language that specifically addresses accessibility for persons with disabilities in all EIT RFP's (requests for proposals) and contracts to be in compliance with the Federal Acquisition Regulation or other applicable federal procurement regulation.

2. Agencies Not Subject to the Federal Acquisition Regulation (FAR). Although most agencies are covered by the FAR, any that is not should consult with the Access Board without delay to ensure that its procurement regulations are appropriately modified to incorporate the Section 508 Standards when they are final.

3. Discontinue Ad Hoc Approach. Each agency that has not already done so should develop systematic ways to ensure that it is procuring accessible EIT products, rather than relying on an ad hoc approach. This method will increase the interoperability of different types of technology and is especially necessary as technology increases in complexity. Each agency should review all of its procurement practices and policies, formal and informal, to determine whether accessibility issues are appropriately addressed.

## Technology-Specific Findings and Recommendations

### *Federal Agencies' Web Pages*

Federal agencies' Internet and intranet sites contain some barriers to access for people with disabilities. The most commonly encountered barrier is the failure to provide appropriate and meaningful text information for visual images ("alt text" for simple images and icons and long descriptions for more complicated graphics). This barrier, like others that are encountered less frequently, can be eliminated quite easily with minimal design changes.

Part of the reason that agency Web pages are relatively easy for people with disabilities to use is that most agencies have consciously decided to make their pages readily usable by people who use older, less expensive, and less sophisticated technology. Federal Internet pages tend to be free from the "bells and whistles" that require more particular attention to accessibility issues, such as multimedia content or interactive features.

As agencies put more of their programs and services online, they must remain vigilant to ensure they are not inadvertently creating barriers for people with disabilities. Online forms and documents rendered exclusively in Adobe's portable document format (pdf) or Microsoft's PowerPoint format may raise particular concerns.

As most barriers on agency Web sites result from an inattention to detail rather than an underlying difficulty with the design or technology, agencies should invite people with disabilities to inform them when they encounter barriers.

To address these issues and others detailed in the Report, the Department recommends the following:

1. Testing Web Pages Before Posting. Each agency should evaluate for accessibility all of its new Web pages before they are posted. Existing Web pages should be tested as they are updated. Testing should be done with text-only browsers and, where possible, with assistive technology such as screen reading software to ensure that the experience of users with disabilities is comparable to that of others.

2. Agency Web Guidelines. Each agency that has developed style guidelines to maintain a consistent "look and feel" of its Web pages should review those guidelines to ensure that they will maximize the accessibility of the agency's Web pages.

3. The Government Printing Office (GPO). Many smaller agencies rely on the GPO for their Web site design and maintenance. While section 508 does not apply to the GPO, the GPO should provide leadership to ensure that all Web pages it develops or maintains are accessible.

4. Dedicated E-mail Addresses. Because most accessibility problems on agency Web sites result from oversight or lack of awareness of accessibility issues, rather than technical or design difficulty, each agency should prominently post to its Internet pages an e-mail address through which users with disabilities can inform the agency of any accessibility barriers encountered. Each agency should be responsive to any e-mails it receives regarding the accessibility of its Web site to people with disabilities.

5. Accessibility Information Logo. The National Endowment for the Arts, along with the Universal Access Working Group, GSA, and the Access Board, should develop an easy-to-recognize accessibility information logo (and alternative text label). Each agency should use this logo (and text label) to link people with disabilities who use its Web pages with appropriate accessibility instructions and information, including an e-mail address to the agency's accessibility point-of-contact.

6. Location of Accessibility Information. Where it makes sense to do so, such as when placing a link to a text-only alternate Web site or when posting the accessibility instruction logo and label, each agency should place accessibility information in the uppermost left-hand corner of its Web pages. This location will facilitate use of the agency's Web pages by people who use screen readers, as it is the first location from which a screen reader will read.

7. Document Formats. As agencies put more of their programs and services online, each must remain vigilant to ensure it is not inadvertently creating barriers for people with disabilities. Online forms created using any of the various Web technologies pose significant accessibility challenges to Web designers. Documents rendered exclusively in Adobe's portable document format (pdf) or Microsoft's PowerPoint formats may raise particular concerns. If any posted documents or forms are less than fully accessible, each agency should also post ASCII or accessible HTML versions of the same documents, where possible. Where exclusive reliance on an inaccessible format is unavoidable, each agency should provide contact information where users with disabilities can request the underlying information in an accessible format, where doing so would not impose an undue burden on the agency or result in an fundamental alteration.

## *Software*

Almost all software applications contained some barriers to some people with disabilities. Most applications, however, provided a fair degree of accessibility to most people with disabilities. Among the communities most likely to face significant barriers are those who are blind, those with low vision, and those with multiple disabilities.

A sizable majority of the software applications used most frequently by agencies are commercial off-the-shelf (COTS) applications used without agency modification. The most commonly encountered barriers in COTS software fall into the categories of (1) documentation and support;[5] and (2) programming.[6]

The Department recommends the following:

1. Training Needs Surveys. Each agency should develop and distribute "training needs" surveys to all employees. These surveys should explicitly address training needs for people with disabilities, especially those who use assistive technology in conjunction with mainstream software applications. EEOC should provide guidance to agencies on this issue.

2. Appropriate, Periodic Training. Each agency should train all IT personnel, procurement officials, "help desks" and other support personnel, and users with disabilities, regarding basic accessibility issues. To conserve resources, GSA and the Access Board, in consultation with other key agencies and inter-agency groups, should create training modules that can be shared among agencies. GSA and the Access Board should also make available lists of appropriate training vendors. Each agency should ensure that specialized training is available for users with disabilities for all software packages for which training is generally provided, including training provided by third-parties on behalf of agencies.

3. Software Compatibility Testing Centers. As agencies update and centralize their IT architecture, they should create software compatibility testing centers at which software can be evaluated for compatibility with existing agency platforms and with commonly used assistive technologies. Larger agencies may wish to establish their own compatibility testing centers. An interagency software compatibility testing center should be established to assist smaller agencies, larger agencies without testing centers, and private software manufacturers and developers. Centers at Department of Defense, Department of Education, the Social Security Administration, Department of Veterans' Affairs, and GSA can serve as models.

4. Documentation (Instructions, Help Files, User Manuals, Etc.). Many software applications have accessibility features of which most users, trainers, 'help desk' personnel, and others are unaware. Other software applications (such as word processors, Adobe Acrobat, etc.) can be used to create information products. Knowledgeable users can use these applications to create information products that are relatively accessible. Other people may inadvertently use the same applications in such a way that the information products they create are largely inaccessible. Each agency should require its software vendors to include clear documentation of the accessibility features and appropriate uses of their products to maximize accessibility.

5. "COTS Software Accessibility Manuals". Because many of the Federal Government's current software applications may continue to be used for a long time, federal agencies must make the most of the accessibility features built into currently-used software, rather than rely exclusively on procurement of new accessible software. GSA and the Access Board, in consultation with other key agencies and inter-agency groups, should consult with software manufacturers and should develop and distribute supplemental manuals for users of commercial off-the-shelf (COTS) software applications. These manuals should include clear instructions for maximizing the accessibility of COTS applications currently used by federal agencies and for promoting accessibility and minimizing barriers in the information products some COTS applications (such as Adobe Acrobat) are used to produce. Specific information, such as macros developed to provide shortcut keys where none previously existed, should be incorporated into these manuals.

6. Government-Wide, Low-Cost Programming Solutions. GSA and the Access Board, in consultation with other key agencies and inter-agency groups, should contact manufacturers of COTS software to determine whether software updates, containing programming "fixes" of barriers identified in this Report, may be obtained freely or purchased for a low fee and distributed throughout all federal agencies. Each agency that has already developed programming solutions to remove barriers to COTS applications should be encouraged to continue this work and to share their results with all appropriate agencies.

### *Telecommunications*

Telecommunications poses specific accessibility issues for almost every community of persons with disabilities, including people who are deaf or hard of hearing and those with speech impairments, people who have difficulty pressing touch-tone buttons, persons with visual impairments who cannot see visually displayed information such as message waiting or caller ID indicators, and persons with cognitive impairments or learning disabilities who have difficulty understanding or

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remembering serial connection choices (press *1* for ___; press *2* for ___; etc.).

Few agencies are fully utilizing the efficient, low-cost services that are available to them, such as the Federal Information Relay Service (FIRS)(which allows deaf and hard of hearing people to communicate via telephone with people who do not have special equipment, such as TTYs).[7] The lack of awareness of such resources has a negative impact on federal employees and job applicants with disabilities, as well as members of the public with disabilities. Training is often all that is required to improve this situation.

Few agencies provide equivalent direct-access TTY connections for serial connection services, automated call sequencing connection services, or other interactive telephone services. As these services can be difficult or impossible to navigate using the Telephone Relay Service, few agencies have automated telephone systems that can be used at all by people who are deaf or hard of hearing. For minimal cost, additional lines with text messaging modes can be installed. These serial connection services and automated interactive telephone services can be made generally accessible to a wide variety of people with disabilities — including people with cognitive impairments and learning disabilities, mobility impairments affecting dexterity or speed, and others — simply by providing an operator.

Most agencies that provide employees with pagers have text pagers with vibration signals; these pagers are accessible to people who are deaf or hard of hearing.

Few agencies have begun using the wide variety of disability-friendly telecommunications products that are now offered by mainstream telecommunications companies.

In light of these findings and others discussed in the Report, the Department recommends the following:

1. Training. Each agency should train all federal employees who communicate by telephone with the public or with other employees on how to use TTY's, the Telephone Relay Service (TRS), and the Federal Information Relay Service (FIRS). GSA and the Access Board, in consultation with the FCC, should develop a short, electronic training module that can be made available through agency intranet sites at minimal expense.

2. TTY's in Public Areas. Each agency should provide TTY's, outlets, and shelves wherever the agency provides telephones for members of the public.

3. TTY's in Call Centers. Each agency should install TTY lines wherever it receives a large volume of incoming calls.

4. FIRS. GSA, in consultation with the FCC and other key agencies and inter-agency groups, should explore upgrading the Federal Information Relay Service (FIRS) to include video relay interpreting and speech-to-speech relay services.

5. Operators. Each cabinet level, large, and mid-sized agency should make operators available on its interactive automated telephone services and should allow callers to connect with operators by pressing "0" or by staying on the line. See General Appendix A (Categories of Agencies). Small and very small agencies should explore cost-sharing measures to provide operators for their interactive telephone services.

6. Equivalent Interactive TTY Telephone Services. Each agency should configure its interactive telephone systems to be compatible with TTY's – or should provide equivalent TTY interactive systems containing the same functions and information (and updated as often). This goal can be easily accomplished by adding a second telephone line with a TTY message and TTY compatible features that are equivalent to those provided on the interactive voice systems.

7. Equivalent TTY Toll-Free Information Services. Each agency that provides toll-free information lines should ensure that those lines support TTY use or the agency should maintain equivalent separate toll-free TTY information systems that are staffed to be as responsive as the standard toll-free information lines.

8. Computer-Based TTY Equivalency Systems. GSA and the Access Board, in consultation with the FCC and other key agencies and inter-agency groups, should explore purchasing a government-wide license (or multiple licenses to offer to agencies) of ASCII/computer-based TTY systems to

ensure that all agencies' employees with networked computers have TTY equivalency on their network with minimal per-employee costs. Appropriate attention should be paid to factors such as computer network security.

9. Voice Recognition Technology. GSA and the Access Board, in consultation with the FCC and other key agencies and inter-agency groups, should explore buying multiple licenses for voice recognition technology to install on all agencies' interactive telephone systems.

10. Telecommunications Technology Assistance Center'. The FCC, in consultation with GSA, the Access Board, and other key agencies and inter-agency groups, should establish a telecommunications technical assistance center. This Technical Assistance Center should assist agencies in working with manufacturers — for example, to reconfigure telephone systems to send a "wait" signal to TTY users — and to take full advantage of advances in technology that are coming from section 255 of the Telecom Act and section 508 of the Rehabilitation Act.

## *Kiosks and Other Information Transaction Machines*

Few agencies currently use information kiosks, point-of-sale card reading machines, electronic building directories, or other types of 'information transaction machines' or ITMs. Where they are used, some ITMs can be made more accessible to people with mobility impairments, such as those who use wheelchairs, simply by moving them to more accessible locations. Other barriers, such as an ITM's failure to provide an audio mode that can be used by people who are blind or who have low vision, can be more properly addressed by manufacturers.

Because section 508 does not require agencies to retroactively remove barriers (although agencies continue to have nondiscrimination and reasonable accommodation obligations under sections 501 and 504 of the Rehabilitation Act), agencies with inaccessible ITMs should ensure that the programs or services for which nondisabled people use ITMs are accessible to people with disabilities through alternate means.

In light of these findings and others identified in the Report, the Department recommends the following:

1. Non-Agency-Owned ITMs. Each agency that has facilities or property containing ITMs that are owned or controlled by other entities (including private entities, other federal agencies, or others) should notify them of any barriers to access in their ITMs and recommend that such entities address accessibility issues on a specific time schedule.

2. Location of ITMs. Each agency that has ITMs should ensure that its ITMs are located on accessible routes and are otherwise accessible to people with disabilities such as those who use wheelchairs.

3. Inaccessible ITMs. If an agency's existing ITM is inaccessible or contains inaccessible features, the agency should ensure that whatever information or services the agency provides on the ITM are also available through an accessible and comparably convenient and useful alternate means of access (e.g., automated telephone service or through the Internet). The agency should provide appropriate signage with full instructions regarding use of the accessible alternative method of obtaining information or services.

4. Upgrading Existing ITMs. While section 508 does not generally require retrofitting existing EIT, each agency that replaces or updates an ITM's software or hardware should look for and take advantage of easy opportunities to improve the ITM's accessibility.

5. Instructions. Many times, an ITM contains accessible features, such as a volume control mechanism, but instructions on how to use these features are missing or inadequate. Each agency that has an ITM should survey the ITM and, if appropriate, contact the ITM vendor for a full list of accessible features. The agency should provide clear instructions in accessible formats.

## *Fax Machines, Copiers, Printers, and Other IT Office Equipment*

Most fax machines, copiers, printers, and other IT office equipment contain barriers to access by people with disabilities. For instance, most copiers

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give error messages on liquid crystal display (LCD) screens that are generally inaccessible to people who are blind or who have low vision. Many LCD screens are angled so that they are difficult or impossible for people who use wheelchairs to read them.

Agencies generally found that when they used IT office equipment that was attached to their computer network, many of these barriers were eliminated. Most networked office equipment is designed to communicate with the user while he or she is at his or her workstation. Desktop computers can be easily equipped with assistive technology, such as screen readers, for people with disabilities.

For these reasons, and others set forth in the Report, the Department recommends the following:

1. Instructions. Many times, office machines contain accessible features, such as a volume control mechanism on a fax machine, but instructions on how to use these features are missing or inadequate. Each agency should survey its fax machines, copiers, and printers and, if appropriate, contact vendors for a full list of accessible features. The agency should provide clear instructions in accessible formats.

2. Networked IT Office Equipment. The extent to which copiers and fax machines are accessible is greatly enhanced when the user can send commands from an attached desktop computer terminal (such terminals may be easily outfitted with the appropriate assistive technology to meet an individual's needs). Each agency should, in appropriate circumstances, seek out network solutions over stand-alone machines when such solutions would provide a greater degree of accessibility for employees and members of the public with disabilities.

3. Instructions for Alternatives. For inaccessible IT office equipment that is available to the general public or a large number of employees, each agency should ensure that accessible instructions are available on how a person with a disability can obtain accessible alternative services (such as where to seek assistance).

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[1] This document is available on the Department of Justice's section 508 Web site (www.usdoj.gov/crt/508). People with disabilities may request copies in Braille, large print, or on computer disk by calling 1-800-514-0301 (voice) or 1-800-514-0383 (TTY).

[2] Some people who are blind and people who are deaf-blind use computer devices called "refreshable Braille displays," which move pins up and down to form Braille letters. The user "reads" the Braille letters across a line, then advances the Braille display to the next line when ready.

[3] Revitalization of the IDCC will enable it to function as a central coordination point to eliminate duplication of efforts and/or inconsistencies among agencies and inter-agency groups.

[4] The Universal Access Working Group is part of the Federal Information Services Applications Council of the National Science and Technology Council's Committee on Computing, Information, and Communications. It is coordinated through the Center for IT Accommodation in the Office of Governmentwide Policy at the General Services Administration.

[5] Frequently encountered documentation and support barriers include:

- A lack of clear instructions for keyboard functions (26%)
- Instructions for keyboard use not widely available (30%)
- Manuals and documentation are not provided in an electronic format with text descriptions of charts, graphs, etc. (37%)
- Specialized training is not provided for users with disabilities (53%)

[6] Frequently encountered programming barriers include:

- Lack of shortcut keys (37%)
- Poorly located field labels and descriptions (24%)
- Application won't allow users to override default fonts for printing and text displays (28%)
- Application does not support "print to ASCII" (26%)

[7] TTYs are text telephones. They are also called 'TDDs' or 'telecommunications devices for deaf persons.'

# Introduction[1]

As we move to a more technology-centered society, where many of our governmental functions are increasingly dependent upon computers and other types of emerging technology, the degree of accessibility of these technologies to people with disabilities will become more significant. Like others, people with disabilities who want to work for the Federal Government, pay their taxes, apply for benefits or services, or have access to the vast amount and variety of information provided by the government to the public, will increasingly use electronic methods to accomplish these goals.

This report, "Information Technology and People with Disabilities: The Current State of Federal Accessibility" (Report), presents a snapshot of whether people with disabilities could easily use the Federal Government's information technology at the time of this survey. It also recommends specific steps to ameliorate some existing problems and prevent future ones. The Report will serve as a baseline against which future progress may be measured. Because agencies are generally not required to retrofit existing information technology to be accessible to people with disabilities (except as a reasonable accommodation upon request from a particular person, or to meet the general nondiscrimination obligations of sections 501 and 504 of the Rehabilitation Act), the Report does not criticize individual agencies, regardless of the current degree of accessibility of their information technology.

## Background

When computers first became a standard feature in the American workplace, people with disabilities were generally able to use the new technology with relative ease, with assistance from adaptive or assistive technology. For instance, people who were blind could function well using operating systems similar to the Disk Operating System (DOS) environment by using a "screen reader" — technology which reads aloud, in an artificial voice, the words and punctuation marks that appear on a computer monitor. Since a computer mouse was not used in a DOS environment, people who were blind who had screen readers could use computers very effectively because everything on the screen and all commands necessary to interact with the software were discrete, text-based commands such as "control P to print." Additionally, very few technology applications contained auditory features, so that most people who were deaf or hard of hearing had no trouble using the technology.

As technology became more sophisticated, applications came to rely heavily on graphical user interfaces (GUI). Software applications and Internet pages now often require users to "point-and-click" — using a computer mouse to click on an icon to accomplish a task. Many people with disabilities cannot work in a "point-and-click" environment unless it contains redundant features, such as a software application that allows the user to choose between clicking on a printer icon or hitting "control P" to print a document. Screen readers cannot read images — icons, buttons, or graphics — unless there is text associated with them. Similarly, multimedia environments tend to screen out people who are deaf or hard of hearing unless important audio information is also conveyed visually.

## Section 508 of the Rehabilitation Act

The transition from a DOS environment to a GUI environment meant that many people with disabilities who were capable of functioning fully in the past were locked out due to technology advances. Congress responded to this unintended consequence of the evolution in technology by passing section 508 of the Rehabilitation Act in 1986. Pub. L. No. 93-112, Title V, § 508, as added Pub. L. No. 99-506, Title VI, §603(a), Oct. 21, 1986, 100 Stat. 1830. The amendment, entitled "Electronic Equipment Accessibility," called for the Administrator of the General Services Administration and the National Institute on Disability and Rehabilitation Research (NIDRR) of the U.S. Department of Education to develop guidelines for the Federal Government's procurement of accessible electronic equipment. Although this original 1986 version of section 508 required each federal agency to comply with these guidelines, little progress was made.

Twelve years later, when Congress revisited the Rehabilitation Act in the context of the Workforce Investment Act of 1998, Pub. L. No. 105-220, 112 Stat. 936 (1998), it acknowledged the need for new legislation to strengthen section 508. The Senate Labor and Human Resources Committee found the Rehabilitation Act Amendments of 1998 "provide needed emphasis on . . . access to computers and information technology." S. Rep. No. 105-166, at 2 (1998). Under the amended section 508, electronic and information technology (EIT) that is developed, procured, maintained or used by federal agencies must be accessible to federal employees and members of the public with disabilities, unless compliance would impose an undue burden. Section 508 contains six key concepts:

•*Section 508 Standards*. The Architectural and Transportation Barriers Compliance Board (Access Board) will issue final Section 508 Standards to measure the degree of accessibility to people with disabilities of the Federal Government's electronic and information technology.

•*Agencies' responsibilities*. Agencies' EIT products must comply with the Access Board's Section 508 Standards – which will be rolled into the Federal Acquisition Regulation (FAR) and into the acquisition regulations of all agencies not covered by the FAR — if the products are procured on or after August 7, 2000.

•*Periodic compliance reviews and reports*. Under the guidance of the Department of Justice, every federal agency will periodically evaluate the accessibility of its EIT and the Department of Justice will evaluate agencies' responses to complaints. This information will be gathered in reports from the Attorney General to the President and Congress.

•*Enforceability*. Both members of the public and federal employees with disabilities can sue in federal court or file administrative complaints for violations of section 508 with respect to EIT procured on or after August 7, 2000.

•*Bid challenges*. Because the Section 508 Standards will become part of the FAR, losing bidders who offered accessible EIT products to agencies may challenge the bid process if they believe that an agency awarded a bid to the offeror of an inaccessible product, where procuring the more accessible product would not have imposed an undue burden.

•*Section 508 applies regardless of whether an agency has employees with disabilities.*

Section 508 contains some important limitations:

•*Built-in assistive technology is not required where it is not needed*. The law does not require every workstation of nondisabled employees – or every EIT product – to be fully accessible to persons with disabilities. Products like desktop computers do not have to be outfitted with refreshable Braille displays, but they must be compatible with refreshable Braille displays so that if an individual who is blind needs one as a reasonable accommodation, he or she can use it with the agency's standard workstations. The Access Board's Section 508 Standards will determine when an EIT product must be fully accessible and when it must only be compatible with assistive technology.

•*Undue burden*. Agencies do not have to procure EIT products that satisfy the Access Board's Section 508 Standards if doing so is an *undue burden*. "Undue burden" generally means a "significant difficulty or expense." The Standards will include factors that agencies can use to help apply this term consistently.

•*Development, maintenance, and use of EIT products*. In addition to its language regarding procurement, section 508 requires agencies to "develop, maintain, and use" only EIT products that are accessible to and usable by persons with disabilities. However, the enforcement provisions of section 508 cover only "procurement" of EIT products. Members of the public and employees with disabilities cannot sue pursuant to section 508 for agencies' development, maintenance, or use of EIT products unless these products were *procured* on or after August 7, 2000. Agencies continue to have long-standing obligations under sections 501 and 504 of the Rehabilitation Act to provide reasonable accommodations to qualified individuals with disabilities upon request. See "Other Requirements of the Rehabilitation Act," below.

•*Private use of EIT products is unaffected.* While manufacturers and designers of EIT products generally will not be able to sell or lease inaccessible products to federal agencies and departments for procurements after August 7, 2000, section 508 does not extend to these companies' own use of EIT products. For instance, if a manufacturer wishes to sell desktop computers to federal agencies, it must ensure that these computers comply with the Access Board's Section 508 Standards or agencies will be unable to purchase them. It does not, however, affect the company's own computers (used by its own employees), those offered for sale to the public, nor does it affect the company's Internet site or other uses of EIT.

## Other Requirements of the Rehabilitation Act

Section 508 cannot be fully grasped without a basic understanding of sections 501 and 504 of the Rehabilitation Act. These sections contain general prohibitions of disability-based discrimination and generally require federal agencies and departments to provide reasonable accommodations to qualified persons with disabilities, including employees and members of the public, upon request. "Reasonable accommodations" are not one-size-fits-all responses to disability access issues. Instead, they are measures carefully tailored to meet the needs of an individual with a disability to enable him or her to accomplish a particular job or participate in a specific program. What is a reasonable accommodation for a person with a disability in one position may not be adequate or appropriate for another person with a disability in the same position.

*Compare:*

> Section 508 is "technology-centered" and focuses on whether mainstream EIT products meet the Access Board's Section 508 Standards, whether or not an agency has employees with disabilities or serves members of the public with disabilities.
>
> The reasonable accommodation provisions of sections 501 and 504 are "person- centered" and focus on how an individual's disability should be accommodated in a particular setting.

As the Access Board's Section 508 Standards cannot — and do not pretend to — ensure that all EIT will be universally accessible to all people with disabilities, reasonable accommodations will always be required in some instances. However, as agencies pay more attention to accessibility when procuring or developing their EIT, they will find it easier and easier to provide reasonable accommodations when requested to do so. In some instances, people with disabilities may not need accommodations at all, as the underlying technology will be fully accessible to them.

Example: When an agency is choosing among e-mail systems to buy for its employees, section 508 requires the agency to consider whether the systems will be accessible for people who are blind and who use screen readers (regardless of whether the agency has any current employees with disabilities). Sections 501 and 504 would require the agency to provide screen reading software to a specific individual who is blind, upon request, as a reasonable accommodation that would enable the person to perform his or her job functions. On the other hand, if the agency ignores section 508 and purchases an e-mail system that cannot be used with screen readers, it may not be able provide a reasonable accommodation to future blind employees to enable them to use the shared e-mail system.

## The Department of Justice's Section 508 Self-Evaluation Guidance to Agencies

Section 508 requires the Attorney General to lead all executive agencies and departments, including the United States Postal Service, conducting self-evaluations to determine the extent to which their EIT is accessible to persons with disabilities. This Report reflects the results of these evaluations and provides a baseline against which progress can be measured. It is based on information from 81 agencies, including over 250 components.

The information gathered during the self-evaluation process -- and, consequently, the conclusions drawn by the Department of Justice in this Report -- have some inherent limitations. The Department found that it was difficult to guide agencies to conduct meaningful evaluations of the degree of accessibility of their EIT because there were no

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settled criteria against which such measurements could be taken. The Access Board's final Section 508 Standards will not be published until August 7, 2000. Indeed, the term "electronic and information technology" – upon which the very scope of section 508 depends – will not be clearly defined until the Standards are published. The Department, therefore, had to determine the best sources of information available in the public and private sectors and create its evaluation tools accordingly. The resulting Component Questionnaire, which formed the basis for all of the self-evaluations, reflects the Department's best initial view as to what types of technology would be covered by section 508 and what factors would enhance the degree to which these technologies are accessible to and usable by persons with disabilities. While many elements of the Department's evaluation tools may correspond well to those of the Access Board's final rule defining EIT and implementing Section 508 Standards, there will, no doubt, be some differences. Readers should keep these limitations in mind.

Coordination of this effort posed a daunting challenge. The Federal Government is by far the single largest employer and service provider in the country. There is no uniformity among agency administrative models: Small agencies tend to have a single centralized procurement and information technology (IT) infrastructure, while larger and cabinet-level agencies tend to be more complex and broken into sub-units, often called "components."[2] For instance, the Marine Mammal Commission – with 10 employees – has a single, unified, hierarchical structure. In contrast, the Department of Justice, with approximately 96,000 employees, is divided into many components with decentralized and widely varying procurement policies and technological needs: the degree to which technology is used and the types of technology employed by the Federal Bureau of Prisons is vastly different from that of the Civil Rights Division. Still other large agencies are decentralized to the point that their many individual components are almost entirely autonomous with respect to their procurement policies and their choice of information technology systems. For these agencies, simply identifying all of the components of the agency posed a formidable challenge for those (i.e., "Designated Agency Officials") who were responsible for coordinating their agencies' self-evaluation efforts.

When creating the evaluation tools, the Department decided that a multi-faceted approach made the most sense: Agencies would be asked to consult with their employees with disabilities, test certain products using common assistive technologies, answer objective "checklist-style" reports for some types of technology, and provide a subjective evaluation of their findings. This combination of approaches was used to evaluate the most commonly-used federal agency Internet and intranet sites, software applications, kiosks and other information transaction machines, and printers, copiers, fax machines, and other office EIT.

Another portion of the Component Questionnaire asks about components' telecommunications products and services. These questions focus not only on accessibility of the telecommunication products and services themselves, but also whether components have properly trained their personnel to make the most of free, easy-to-use telecommunication services designed to enable those who are deaf, hard of hearing, or who have speech disabilities to communicate by telephone with others. Many of these questions relate to agencies' compliance with sections 501 and 504 of the Rehabilitation Act.

The Department also instructed each component to look at its procurement practices and policies to determine whether they were appropriately incorporating accessibility into their solicitation and evaluation of procured mainstream technology products and services.

Because this Report is intended to provide a baseline for later comparison, not a comprehensive evaluation of every technology product used by every federal agency, the Department determined that the most useful evaluations would be those that focused on the most widely-used technology products in each component. For instance, as explained in greater detail below, components were instructed to evaluate the 10 software applications that were used most widely within each component; the 20 component Web sites with the greatest traffic volume (or number of "hits") on a weekly basis; the 10 most widely-used information transaction machines; and the 10 most widely-used fax machines, printers, copiers, or other office machines.

Finally, the Department asked each agency to review the data provided by its components, summarize its accessibility strengths and weaknesses, outline any plans it has for improving the degree of accessibility of its EIT, and provide to the Department recommendations for better implementation of section 508 throughout the federal executive branch.

This Report and the data on which it is based reflects a "snapshot" of the Federal Government's degree of EIT accessibility prior to full implementation of section 508. At the time agencies completed their self-evaluations and when this Report was written, no generally accepted standards existed to guide agencies in their acquisition, development, maintenance, or use of accessible EIT. The Report and the self-evaluation materials provided by the Attorney General to all agencies establish a baseline against which future progress may be measured.

The analysis in the *Telecommunications* and *Procurement Policies and Practices* sections is based upon weighted data. The Department divided agencies into relevant size categories: cabinet level and large agencies, mid-sized agencies, small agencies, and very small agencies. See General Appendix A (Categories of Agencies). Within each category, the Department divided the number of employees for whom a component provided telecommunications or procurement data by the total number of employees in that category for whom telecommunications or procurement data was provided. Within each size category, responses on behalf of a greater number of employees were assigned more weight than responses given on behalf of fewer employees. Specific workforce statistics and weighting factors for each component providing telecommunications or procurement data are found at Telecommunications Appendix A and Procurement Appendix A.

The analysis in the *Web, Software, ITMs*, and *Other IT Equipment* sections is based upon raw data. The Department requested components to provide statistics by which weights could be calculated (*e.g.*, the average number of employees or members of the public to use a software application on a weekly basis). The Department did not have confidence in the accuracy of the data provided with respect to these sections, unfortunately, and could not perform meaningful calculations. For instance, some components provided an estimate of the average number of persons world-wide who used a particular software application on a weekly basis, rather than the number of people who used copies of the application licensed to the component.

In the Report, the Department of Justice does not endorse any particular EIT product, system, designer, or manufacturer.

In all, the self-evaluation of all federal agencies required more time, effort, and coordination than had initially been expected, both by the Department of Justice and all participating agencies. All agency personnel, especially the Designated Agency Officials, deserve recognition, as their diligent efforts have made it possible to create a Report that will help ensure that persons with disabilities will not be left behind in this information age.

## General Findings and Recommendations

The single largest barrier to the successful implementation of section 508 is that one needs to understand information technology as well as the disability accessibility issues. Accessibility issues have largely been the purview of equal employment opportunity offices. Most government IT officials believe that disability accessibility issues are outside their domain. This perspective revealed itself in many ways throughout the self-evaluation process.

The Department of Justice's initial contact with agencies came in the form of a letter and package of information dated April 2, 1999, from the Attorney General to the head of each agency. Because section 508 represented new territory for most agencies, the Department could not draw upon existing points of contact within each agency. Accordingly, each agency was directed to designate a point person — or "Designated Agency Official" (DAO) — with whom the Department could correspond throughout the self-evaluation process. Agencies were given ten days to fax the DAO's contact information to the Department (name, title, address, telephone and fax numbers, and e-mail address), using a standard form provided for their use. Very few agencies met this initial deadline. The Department later discovered that most packages had traveled in a routine pattern: The staff of many agency heads (commonly called the "front office") — upon reading words like "Rehabilitation Act" and "disability" — initially sent them to their equal employment opportunity offices (EEO offices). The EEO offices — upon seeing words like "gifs" and "applets" — usually sent them back. The front offices then often sent the packages to the Information Resource Management (IRM) offices, or their equivalent. The IRM staff, upon reading the words "screen readers" and "refreshable Braille displays," decided that there must have been some mistake and usually sent the packages back to the EEO office . . . and so on. The April 12, 1999 deadline for designating agency officials passed with few agencies providing their contact information in a timely manner.

Data provided by the agencies suggest that the majority of agencies that continue to handle IT accessibility issues exclusively on an "ad hoc" or "as needed" basis, instead of integrating accessibility into the development and procurement of their mainstream IT products. Many IT officials hold the mistaken belief that persons with disabilities can always be accommodated upon request by using widely available assistive technology devices (*e.g.*, screen readers, screen enlargers, volume control apparatuses, pointing devices that serve as alternatives to a computer mouse, voice recognition software, etc.) in conjunction with mainstream technology applications. Indeed, the goal of section 508 is to ensure that the agency will always be able to provide reasonable accommodations. Without adequate planning, however, the possibility of providing an accommodation to person with a disability may be foreclosed. See, *e.g.*, the discussions of accessibility barriers created by certain uses of Adobe Acrobat's Portable Document Format, in section III, n. 19. Use of an "ad hoc" or "as needed" approach to IT accessibility ***will*** result in barriers for persons with disabilities. A much better approach is to integrate accessibility reviews into the earliest stages of design, development, and procurement of IT. Once an accessible IT architecture is established, then – and only then – can persons with disabilities be successfully accommodated on an "as needed" basis.

While it is clear that most agencies would benefit from increased communication among their IT personnel, EEO staff, and employees and members of the public with disabilities, it would be a poor use of scarce government resources to require each agency to set up isolated mechanisms for determining the extent of accessibility for IT products and services. A more successful approach would be to create a means – or multiple means – for agencies to share information as it is developed. Many of the recommendations included in this Report are designed to facilitate effective coordination among agencies.

The Report is organized into the same subject areas that formed the core of the *Component Questionnaire*:

1. Federal Agencies' Web Pages
2. Software
3. Telecommunications
4. Information Transaction Machines and Kiosks
5. Fax Machines, Copiers, Printers, and Other IT Office Equipment
6. Procurement Policies and Practices

In addition to the summaries and analyses of the survey data, the Department has included some anecdotal information gathered from persons with disabilities and some agencies. Several of these anecdotes are real-life examples of barriers encountered by persons with disabilities (members of the public and federal employees). Others single out "Promising Practices" of several agencies which have shown leadership or innovation in addressing disability accessibility issues.

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[1] This document is available on the Department of Justice's section 508 Web site (www.usdoj.gov/crt/508). People with disabilities may request copies in Braille, large print, or on computer disk by calling 1-800-514-0301 (voice) or 1-800-514-0383 (TTY).

[2] It is difficult to draw generalizations, however. For instance, the extremely large United States Postal Service – with 800,000 employees – has a centralized procurement and IT infrastructure, making it more like the Marine Mammal Commission than the Department of Justice in this regard. Other cabinet-level agencies with single components reporting on section 508 issues include the Executive Office of the President and the Departments of Education, Housing and Urban Development, and Veterans' Affairs.

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# Federal Agencies' Web Pages[1]

The Internet has become enormously popular within the last decade. People now use the World Wide Web to find information, order books, and even buy their groceries. Most likely, this trend of information and commerce becoming increasingly "online" will continue for years to come. We have also witnessed the "look and feel" of the Internet changing dramatically within recent years. At first, the Internet provided minimal content— mostly text and only an occasional picture. Then, interactive forms, "real-time" storm tracking weather maps, and audio recordings of historical speeches became available. With each passing day, the content of the Internet becomes richer.

Many of these changes make it easier for people with disabilities to apply for government jobs, pay taxes, apply for services or benefits, and take advantage of the huge amount of Federal Government information that is now online. Others do not.

Like the private sector, federal agencies have seized upon the Internet as a low-cost way of making its goods and services available to a wide audience. According to the Department of the Treasury, the Web site for the Internal Revenue Service is visited by over a million taxpayers each year. The National Aeronautics and Space Administration, an agency which has captured the imagination and dreams of so many Americans, now uses the Internet to reach and inspire a new generation of scientists and explorers. Given the relatively low cost of publishing information on the Internet, agencies now reach many more people at much lower cost than previous thought imaginable. The Internet will undoubtedly continue to grow as way of disseminating information to the public and to federal employees.

At the same time, making federal agencies' Web sites accessible to persons with disabilities is extremely easy and cost-effective. Persons with disabilities have historically been segregated and denied opportunities that nondisabled people take for granted. The Internet now provides an opportunity to fulfill the promise of including all Americans in this new information age.

For many agencies, the section 508 self-evaluation was the first time they focused on accessibility of their Web sites to people with disabilities. Agencies met this new challenge with enthusiasm, honestly evaluating the strengths and weaknesses of their Web pages and developing strategies for making this resource more accessible to everyone. Agencies reported on strategies that they used to make their Web sites more accessible and recommended others. The responses reflect a panoramic view of how different agencies — some with only five employees and others with hundreds of thousands of employees or more — met the challenge of accessibility.

Different communities of people with disabilities experience different barriers to access when using federal agencies' Web pages:

- People who are blind and who use screen readers may require that all non-text items (such as pictures, charts, and graphic elements) have text alternatives.

- Users with cognitive disabilities and those who have visually-induced seizure disorders may require content without flashing or distracting elements.

Generally, removal of barriers on federal agencies' Web sites is simply a matter of good design. It also benefits others, such as those who use low-end technology with lower modem speeds and people who use wireless Internet connections.

## The Evaluation Tools

To evaluate the level of accessibility of Internet and intranet pages of federal agencies to persons with disabilities, each component was asked to evaluate 20 of its most popular[2] Web pages both objectively and subjectively. The objective evaluation tool was the "Web Page Accessibility Checklist" developed by the Department of Justice for this survey. The subjective element required evaluators to download and use Lynx, a text-based Web browser used by many people who are blind or who have low vision, to "experience" the Web page in the same manner that it would be experienced by someone who used a screen reader.

For each of its 20 most popular Web pages, the component was instructed to identify the page as follows:

- give its URL/URI Web address — usually beginning with "http://www.______;"
- estimate the average number of times the page is used on a weekly basis; and
- choose a description from the following list:
  - (a) online form for services or benefits;
  - (b) other online form;
  - (c) instructions for receipt of services or benefits;
  - (d) description of activities;
  - (e) employment postings;
  - (f) inherently graphical content (e.g., map or photograph); or
  - (g) other (describe).

Components were then instructed to evaluate each page using both the objective and subjective evaluation tools.

### 1. *Objective Survey Tool: The "Web Page Accessibility Checklist."*

The Department of Justice's "Web Page Accessibility Checklist" was based on the work of the Web Accessibility Initiative (WAI) of the World Wide Web Consortium (W3C).[3] This resource formed the basis for our questions because of the current absence of accessibility standards for federal agencies' Web pages. The WAI works with other organizations for the development of Web accessibility standards (including guidelines for page authoring) and educates, researches, and develops Web accessibility standards.

As with the other "Accessibility Checklists" developed by the Department of Justice for the Section 508 Self-Evaluation, each question is phrased so that an affirmative response (a "yes" answer) indicates a greater decree of accessibility for persons with disabilities than a negative response (a "no" answer).[4]

For discussion purposes, specific questions from the Department's Web Page Accessibility Checklist are categorized as follows:[5]

- Making visual information accessible through text or audio
- Making audible elements accessible
- Using colors and contrast wisely
- Minimizing distracting and harmful elements
- Making the most of organizational elements
- Using scripts and style sheets
- Providing text-only alternative pages

### A. Making Visual Information Accessible Through Text or Audio.

With the continuing evolution of the Internet, Web pages are providing more information for users. Although most of the content of the Internet originally included only plain text, Web pages now include graphic images.

Questions 1-8 of the Department's Web Page Accessibility Checklist are designed to measure whether text equivalents are provided for visual, non-text content (images, video, etc.).[6] As explained in the WAI Guidelines, providing text equivalency of non-text content is of paramount importance in making Web pages accessible to many types of persons with disabilities:

> Text can be readily output to speech synthesizers and Braille displays, and can be presented visually (in a variety of sizes) on computer displays and paper. Synthesized speech is critical for individuals who are blind and for many people with reading difficulties that often accompany cognitive disabilities, learning disabilities, and deafness. Braille is essential for individuals who are both deaf and blind, as well as many individuals whose only sensory disability is blindness.

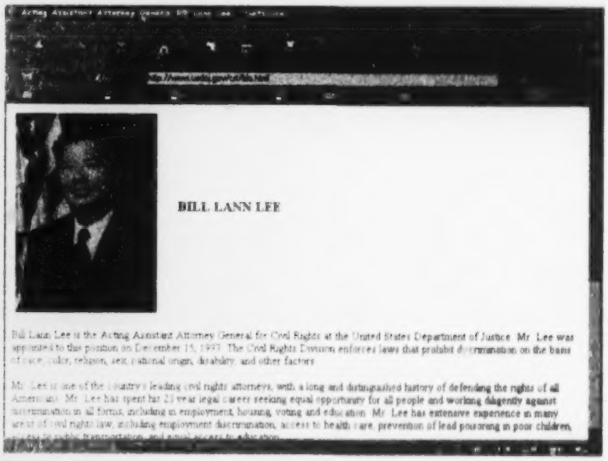
WAI Guidelines.

1. For all images, is alternative text provided?

*Note: This includes images used as spacers, bullets in lists, and links.*

This question was asked first because of its paramount importance in providing access to persons with disabilities and the overwhelming ease with which images can be designed to be accompanied by text: it is both important and simple to do. Additionally, Web designers can write Web pages so that the alternative text is not displayed on the screen — yet is available to screen readers and other assistive technology. This design feature allows Web designers to maintain a clean look while achieving a high degree of accessibility.

To give some idea of the simplicity of creating such alternative text, below is a familiar Web page that includes an image (Figure 1).



**BILL LANN LEE**

Bill Lann Lee is the Acting Assistant Attorney General for Civil Rights at the United States Department of Justice. Mr. Lee was appointed to this position on December 15, 1997. The Civil Rights Division enforces laws that prohibit discrimination on the basis of race, color, religion, sex, national origin, disability, and other factors.

Mr. Lee is one of the country's leading civil rights attorneys, with a long and distinguished history of defending the rights of all Americans. Mr. Lee has spent his 25 year legal career seeking equal opportunity for all people and working diligently against discrimination in all forms, including in employment, housing, voting and education. Mr. Lee has extensive experience in many areas of civil rights law, including employment discrimination, access to health care, prevention of lead poisoning in poor children, access to public transportation, and equal access to education.

**Figure 1**

In writing the Web page that appears as Fig. 1, the Web designer must include a "link" to the image. That link is written as:

<IMG SRC="blee3.jpg" border=0>

Rewriting the Fig. 1 link to include alternative text involves nothing more than simply adding the boldfaced language:

<IMG SRC="blee3.jpg" border=0
**ALT="Photograph of Bill Lann Lee">**

This simple change is all that is required to make this image understandable to persons using a screen reader or Braille display. A blind person would then encounter the words "Photograph of Bill Lann Lee" (which would be read by his or her screen reader), and would know that the graphic was a photograph of Bill Lann Lee instead of a map of the United States or other graphic content.

Nevertheless, a large number of federal agencies' Web pages do not incorporate this simple change. Of the 3,028 total number of Web page surveyed, 881 — or almost one-third — do *not* include alternative text for their images. See Table 1.[7]

Most components whose self-evaluations revealed that they do not routinely include text alternatives for images have generally noted in their overall evaluations that they will change their policies and will begin to provide text alternatives on a regular basis.

2. For all Applets, are alternative text and content provided?

An applet is a small computer program that is automatically downloaded through the Internet and run on the user's machine when the user visits a Web page that includes an applet. Because applets actually operate on a user's machine, they often make Web pages "feel alive" because a user does not have to wait for information to be transmitted back and forth across the Internet.[8] As these applets may provide video or audio output (or both), it is important that users with sensory disabilities have access to alternative text and content for this information, for the same reasons that they need access to alternative text to images. If a text description of an applet is too long to be integrated within the limited space available, an agency Web designer can set up a separate page and put a text link to this page next to the inaccessible applet.

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An example of the appropriate use of alternative text to provide access to the contents of an applet appears on the Office of Personnel Management's home page (http://www.opm.gov). For users who are running Java-compatible browsers (i.e., Netscape Navigator with Java turned "on"), an applet runs near the top of the OPM page, appearing like a box containing scrolling headlines, along with the instruction "Click on the headline for the full story." Users who are not running Java will get a different screen that lists all of the headlines at one time, with the same instruction. This alternative screen is rendered in text and is accessible to those who use screen readers.

Components indicated that relatively few of the federal Internet pages contain applets, and the Department believes that the actual number is even lower. Of the 592 Web pages identified as containing applets,[9] components indicated that a relatively high number of them – 228 – do not include alternative text and content. In reviewing these Web pages, however, the Department found that few actually contain applets.[10] Thus, it is difficult to draw meaningful conclusions whether components using applets on their Web pages are ensuring that the information contained within them is accessible to all persons.

Given that there appears to be little current use of applets in federal Web pages, only a small amount of redesigning would be necessary to ensure that all currently-used applets are made accessible.

3. For all image map links, is alternative text provided?

4. If server-side image maps were used, are text links provided for each hotspot in the image map?

Many Web sites now incorporate image maps as a quick means of navigating within a site. The following Web page from the Office of Personnel Management (OPM) provides links to information about federal employee health benefits, broken down by state (Figure 2).

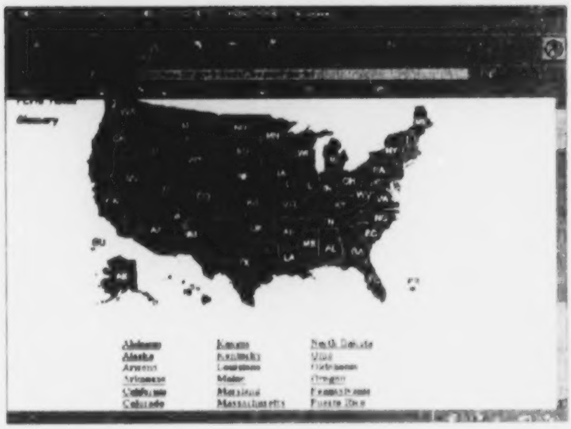


Figure 2

Although the geographical map used in Fig. 2 contains standard 2-letter abbreviations for each state, they are unreadable to screen readers and Braille displays because they are rendered graphically instead of with text. The Web designer, however, has chosen an easy way of making Fig. 2 fully accessible by providing a list of states — in text format — under the geographical map, where the name of each state would be the same link as is activated if the user were to "click" on the state in the map. Users of screen readers can bypass the inaccessible geographical map and select their states from the text list, thus proceeding to pages explaining health benefits in their area.

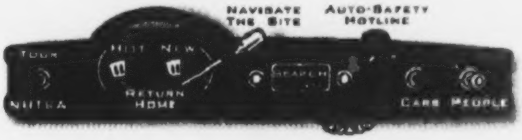


Figure 3

Another example of an image map is shown in Fig. 3, a graphic image of an automobile dashboard used by the National Highway Traffic Safety Administration (NHTSA).[11] Although not a traditional map like the one used by OPM in Fig. 2, the dashboard image is an "image map" because it permits users to choose different options by clicking on different portions of the image. The computer keeps track or "maps" where the cursor is located on the image – the location where the user ultimately hits the mouse button will determine the choice made by the user.

Image maps are further broken down into two subcategories. *Server-side* image maps track the exact coordinates where a user is pointing on an image. When the user click on a region in the map, only the map coordinates are sent back over the Internet. The server-side computer that generates the Web pages then has to calculate a response based on those coordinates. Since the coordinates are sent back over the Internet, alternative text cannot be used to provide accessibility because the user's computer is only aware of the coordinates, not the meaning assigned to those coordinates. Only the server-side computer that generates the Web pages can identify what those coordinates mean. Because alternative text cannot be used for server-side image maps, a separate listing of each of the "hotspots" of the map should be provided to ensure accessibility.

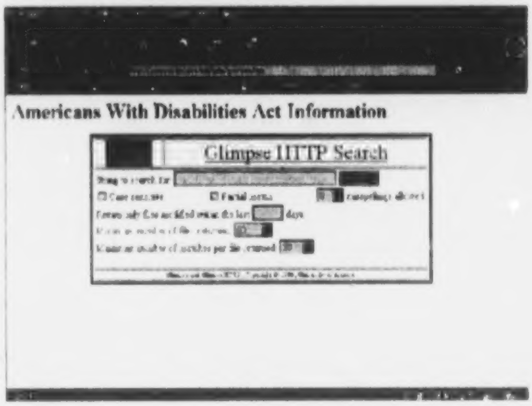
The second category of image maps are *client-side* image maps. For client-side image maps, the user's computer converts the coordinates of the mouse location into the "region" that the user is pointing towards. This region can then have its own alternative text. For instance, if a user is pointing at the state of Utah, the user's computer has identified that the user is pointing at a region called "Utah." Because the user's computer is "aware" of the different regions (as opposed to just the coordinates), alternative text can be provided. As long as the Web designer provides such alternative text, a separate listing of each "hotspot" of the map is *not* required for accessibility (although providing such a listing may provide even greater accessibility).

The self-evaluation responses to Question 3 revealed that of the 3,028 Web pages evaluated, 978 pages (32.3%) had image maps for which alternative text was provided, while 321 pages (10.6%) had image maps where alternative text was not provided. See Tables 2 and 4.

The responses to Question 4 indicated that 21.6% of the pages evaluated had server-side image maps, approximately two-thirds of which had text links provided for each hotspot in the image map (451), while one-third did not (203). See Tables 3 and 4.

| |
|---|
| 5. For all graphical buttons, is alternative text provided? |

Ordinarily, Web pages use buttons that have plain text associated with them. For instance, Fig. 4 shows a Web page that uses a non-graphical button with the text "submit:"

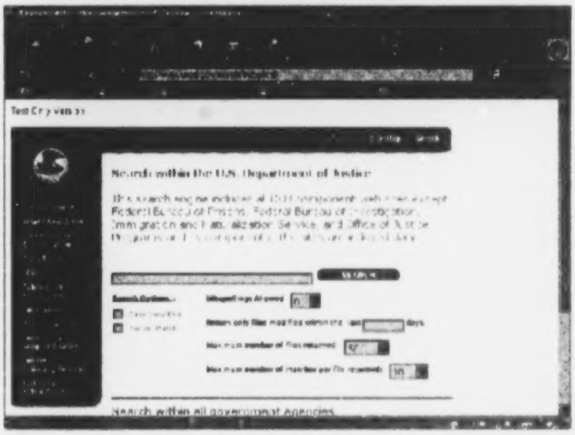


Americans With Disabilities Act Information

Glimpse HTTP Search

Figure 4

Many Web designers, however, consider plain-text "submit" buttons like the one used in Fig. 4 too unimaginative. To make their buttons appear more artistic, Web designers may use graphic images to create "graphical buttons," (Fig. 5):



Search within all government agencies

Figure 5

In Fig. 5, the "search" button is actually an image, just like the photograph of Bill Lann Lee in Fig. 1. Similarly, the search button image in Fig. 5 is inaccessible to someone using a screen reader; thus the search function is inaccessible unless meaningful text is associated with the search button image. As before, the simple solution — used here by the Department of Justice — involves including alternative text (boldface text below) in the link to the image:

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<input type=image src="../navimages/search.gif" width=116 height=22 border=0 **alt="Search"**>

Most federal Web pages that were evaluated contain graphical buttons (71.9%). Unfortunately, a significant portion of these (352 of 2,177) contain graphical buttons that do not have meaningful text associated with them. See Table 5. Missing alternative text means that not only those buttons, but the functions they activate, are inaccessible to many people with disabilities.

6. Is there an absence of ASCII art, and, instead, are images and alternative text used?

So-called "ASCII" art refers to text characters and symbols that are combined to create a graphic image. A simple example is the smiling face "emoticon" :-). More complicated examples may include graphs or logos. For instance, the graph in Fig. 6 would be considered "ASCII art" and not a graphic image, because its "image" is actually comprised of plain keyboard characters:

```
^
|                                        x
|
|                                      x
|
|                                   x
|
|                              x
|                        x
|                   x
|         x
|x
|__________________________________________________>
```

**Figure 6**

ASCII art presents several barriers to accessibility and should not be used where images and alternative text can be used instead.[12] First, because ASCII art is comprised of ordinary typographic characters that have meaning only based on their relative spacing near other characters, its meaning or purpose is unintelligible to users of screen readers or refreshable Braille displays. For instance, people who use screen readers and who come across the "smiling face" ASCII art would hear — in synthesized speech — "colon," "hyphen," "close paren," "period."

Second, because ASCII art often uses a large number of characters, it significantly delays the speed with which users of screen readers and Braille can negotiate Web pages. In more complex instances, such as the one shown in Fig. 6, it can take an extremely long time to parse through the ASCII art to get to the rest of the page's content. Since the person using a screen reader or refreshable Braille display is presented information one character at a time, he or she cannot easily "glance ahead" to see where the ASCII art starts and stops: much like a person listening to a recorded lecture on an audiotape, the only way to skip a particular section and get to something more meaningful or relevant is by trial and error, and repeatedly rewinding or fast forwarding until the desired portion of tape is located.

Of the 3,028 Web pages reviewed by components, only 156 pages reportedly contain ASCII art instead of images and alternative text. The Department's spot-check found that few of these 156 pages actually contained ASCII art. This relatively low use is consistent with an overall trend against using ASCII art as technologies make it easier to use more sophisticated graphics. Due to low usage, therefore, accessibility problems relating to ASCII art are likely to be minimal.

7. If OBJECT was used to incorporate an image, applet, or script into a page, is the information also conveyed in an alternative means in cases where the OBJECT cannot be perceived, such as with "title" or within the body of the OBJECT element?

As Web page design has evolved, Web designers have started to include images, applets, video clips, and programmatic elements into their pages. These features have made possible the introduction of multimedia and interactive elements into Web pages. To give Web designers flexibility in using new and evolving features in their pages, the "object" attribute was adopted as a "catch-all" means of referencing almost any script, image, applet, or multimedia source. For instance, OBJECT can be used to refer to a photograph that will then appear on a Web page at the desired location or OBJECT can be used to create a link to an applet that generates sound. To make these accessible to a wide variety of people with disabilities, however, meaningful alternative text must be associated with the OBJECT tag.

Few federal agencies' Web pages currently contain OBJECT tags. Although 170 of the 3,028 Web pages which components answered "no"to the question of whether alternative text or other means were used to convey the meaning of an OBJECT, a brief review of these Web pages indicates that few, if any, of these Web pages actually included OBJECT at all. Components indicated that the overwhelming percentage of Web pages (84%) did not include OBJECT (answering "not applicable"). Only 325 pages (11%) were identified as using OBJECT and making it accessible through alternative text or other means.

In terms of consequences for the overall accessibility of federal agencies' Web sites, if these sites grow in sophistication, as they are expected to do, more of them will incorporate images, applets, or scripts by using OBJECT. It will be important for those who design and maintain such pages to make these features accessible, through alternative text or other means. Currently, however, OBJECT is used only rarely. Inaccessible instances of its use are likely to be encountered currently only occasionally by people with disabilities.

8. Are long descriptions provided of all graphics that convey important information?

To do so: use "longdesc."

Until most browsers support "longdesc," also use a d-link (description link) or invisible d-link.

Graphics that convey complicated, difficult, or important information often cannot be explained without a lengthy description. Unfortunately, information about an image that is conveyed through an "alt" tag is usually limited to a short title of the graphic image. To convey more complicated or lengthy information, an entire page of text may be required. If a graphic image includes a color map of a metropolitan subway system, the image itself may provide enough information to allow a nondisabled visitor to understand how to travel between stations. Describing the same information without the assistance of a graphic image, however, may a longer narrative describing the different subway lines. If this information is too long to fit on the same page as the graphic, a Web page designer can use a *description link* ("longdesc") to create a link to a separate Web page on which the longer narrative would appear. Without such links, the information in the graphic image cannot be understood by users who cannot see or interpret graphics. Also, if information in the image is conveyed through the use of colors, then a descriptive link may assist people with color blindness.

With respect to 1,839 of the 3,028 (60%) Web pages reviewed in this survey, federal components answered "Not applicable" when posed the question of whether long descriptions were provided of all graphics that convey important information, likely indicating that these pages did not contain graphics that conveyed important information. Components indicated that 412 pages did appropriately include long descriptions under this circumstance, while 777 did not.

In other words, more than 25% of the federal Web pages surveyed contained inaccessible graphics that do not have long descriptions of their content. This routine use of inaccessible graphics is likely to have a substantial impact on the overall accessibility of federal agencies' Web sites. See Table 6.

12. For short animations such as animated "gifs" images, are alternative text and a long description provided, if needed?

Animated graphic image files (GIF's) and animations are typically image files that repeat or change from one image to the next. These animations can comprise either drawn images (as in cartoons) or photographic images. They usually do not include an audio component. Providing either alternative text or a long description is essential to making them accessible to persons who cannot see the animation. Only 15% of the Web pages surveyed contained GIF's, one-third of which were not accompanied by alternative text or long descriptions. See Table 7.

13. For movies, are auditory descriptions provided and synchronized with the original audio?

Unlike most animations and animated GIF's, movies have both visual and audio components. For the user to fully appreciate the content of the presentation, the audio component of a movie is synchronized with the visual component. In a television or movie theater movie, a character's speech is synchronized with the movement of their lips and gestures and a car's screeching tire is synchronized with the moving image of a car speeding away. Therefore, while a blind user may be able to hear the sounds of a movie, he or she may be unable to fully understand the content of the movie unless the video component is conveyed in an accessible manner. An auditory description is typically a description in human or synthesized voice of the key visual elements of a movie or other multimedia presentation and may include information about actions, body language, gestures, and scene changes. These auditory descriptions greatly benefit users who cannot see the presentation. Approximately 7% of the Web pages surveyed reportedly contain video clips. Of those, half were accessible while half were not. See Table 7.

### B. Making Audible Elements Accessible.

Although images may constitute the largest proportion of non-text content on Internet Web pages, sound files are becoming increasingly common. This trend reflects the increasing sophistication of computers (which now provide rich multimedia output) and developing standards for audible content on the Internet.

9. For stand-alone audio files, are textual transcripts of all words spoken or sung as well as all significant sounds provided?

In addition to containing images, Web pages can also include audio files. These audio files are sound recordings that will play on a user's computer when the user hits an icon or clicks on a link. Important sounds (such as spoken or sung words) can be made accessible through a text transcript or caption. In addition to people who are deaf or hard of hearing, transcripts and captions can assist people who have certain language, learning, or cognitive disabilities.

Only 190 of 3,028 surveyed Web pages contain audio clips. A majority of these (111) contain textual transcripts for stand-along audio files and significant sounds, while 79 do not. See Table 9.

10. For audio associated with video, are captions -- textual transcripts of dialogue and sounds -- synchronized with the video?

Although Web pages originally conveyed only graphic and textual information, technological changes have permitted Web site developers to incorporate multimedia content — such as movies with sound — directly into Web pages. Manufacturers of computer equipment and software are increasingly using these multimedia presentations on their Web pages to provide technical assistance or sales information about their products. However, having sound synchronized with video output is essential for these presentations. Moreover, a multimedia presentation describing how to connect a telephone line to a computer's internal modem may have a sound track that states, "now connect your telephone line to our computer's built-in modem connection." Simultaneously, the video presentation shows an actor's hand inserting a clear connector into an unmarked port on the back of the computer. In this case, having an audio description synchronized with a video presentation is critical to understanding both the location of the modem port on the computer and the orientation of the phone connector when inserting it into the computer. As useful as this multimedia presentation may be to most people, however, it is inaccessible to those who are deaf and can be a substantial impediment to persons who are hard of hearing. Multimedia presentations should include textual transcripts (i.e., captions) that are synchronized with the video presentation: a static plain text transcript may become unintelligible if it is not synchronized with the video presentation.

According to the survey, 166 of the 3,028 Web pages surveyed use audio associated with video, 77 of which do not have captions synchronized with video output. See Table 10.

11. Where sounds are played automatically, are visual notification and transcripts provided?

Many Web pages, particularly commercial Web pages, include audio or music files that are played automatically once a user loads that page into their browser. Although these sounds are often simply background music or other unessential audio materials, a Web page developer can also include valuable instructions or information as part of the audio file. Regardless of the importance of the audio output, however, a deaf user is not receiving the full benefits and information of the page without visual notification and text transcripts of the information provided.

Although components reported that 133 of 3,028 Web pages surveyed included sounds that are played automatically, and that more than half of these did not have visual notification and transcripts provided, a brief review of these Web pages indicates that few, if any, include sounds that are played automatically.

## C. Using Colors and Contrast Wisely.

In addition, poor color combinations can make it difficult or impossible for people with low vision to use. For someone with color blindness, it may be impossible to distinguish information that is conveyed only through the use of color. Proper contrast is also of critical importance for persons who have certain types of low vision, even those who are able to distinguish among colors may have difficulty using a Web page that has a very low contrast between its foreground and background colors. Additionally, some people with certain types of low vision — such as macular degeneration — are particularly sensitive to glare; high contrast color combinations may be difficult for them to read for a sustained period.

Fortunately, the issue is not as confusing for Web designers as it might appear. People with low vision can set personal color preferences on their operating systems. Web designers should ensure that their Web sites will not override the user's settings to make the sites accessible to users with low vision.

14. If color is used to convey information, is the information also clear from the markup and/or text?

Hint: One way of testing this is to ask yourself whether the information is available if one is viewing it on a black and white screen.

15. Are foreground and background color combinations used that provide sufficient contrast when viewed by someone with color blindness or when viewed on a black and white screen?

Questions 14 and 15 address the Web site designer's use of color and the functionality created by using color.[13]

Question 14 asks whether color is used to convey information and, if so, whether associated text is being used to clarify the content of the features which utilize color. This question is of obvious importance to users who cannot differentiate between colors. A "no" answer to this question means that users with color blindness are being excluded. However, others such as those with no vision are also are excluded by this deficiency in Web site design because screen readers and Braille displays cannot discern and convey color differences unless they are labeled with text.

Although federal components responded "no" to Question 14 for 153 of the 3,028 Web pages surveyed, a review of these Web pages reveals that few, if any, such pages used color as the means of conveying information. Some or all of these 153 Web pages included the use of either color graphics or colored text, but none of the pages used color itself as a means of conveying information. Furthermore, none of the pages required the user to make such choices as, "click the red button" or "click the blue button." Instead, in all of the pages reviewed, components used color as a means of highlighting certain screen elements without assigning additional meaning to objects based on their color. Therefore, the survey results give a false impression that persons with color blindness would have difficulty with the 155 sites to which agencies responded "No." In reality, color coding does not represent a significant barrier for persons with color blindness to federal Web pages at this time.

Question 15 — regarding contrast between foreground and background colors — does not affects users who are blind, because different color combinations on a screen do not present a barrier to accessibility to those who use screen readers or Braille displays. However, where a user's visual perception cannot distinguish between different colors, using foreground and background colors that are of similar hue (e.g., those that are not easily distinguished on a black and white screen) can pose difficulties for him or her.

Federal components responded that 162 Web pages of the 3,028 did not provide sufficient contrast between foreground and background colors. Unlike the components' responses to Question 14, a spot check of these Web pages indicates that contrast between foreground and background colors may be a problem on at least some of them. See Table 11.

### D. Minimizing Distracting and Harmful Elements.

16. For auto-refreshing or timed response pages, is a second copy of the page provided where refresh only happens after a link has been selected (until user agents provide this ability themselves)?

17. Is the Web page free from any blinking or updating of the screen that causes flicker?

Questions 16 and 17 related to Guideline 7 of the WAI Guidelines, which states:

> Ensure that moving, blinking, scrolling, or auto-updating objects or pages may be paused or stopped.

The importance of these requirements is explained in the WAI Guidelines:

> Some people with cognitive or visual disabilities are unable to read moving text quickly enough or at all. Movement can also cause such a distraction that the rest of the page becomes unreadable for people with cognitive disabilities. Screen readers are unable to read moving text. People with physical disabilities might not be able to move quickly or accurately enough to interact with moving objects.

Question 16 relates to the ability of users with cognitive impairments, learning disabilities, and some disabilities affecting manual dexterity to access two different kinds of Web pages:

- Auto-refreshing pages are Web pages that update or change automatically after a specified time period. Web developers use such pages for a variety of reasons. At least one large commercial bank, for instance, uses such Web pages for security purposes— by automatically replacing the page with a different page after a specified time period, a user's bank account will no longer be visible to other users of the computer. Another reason may be to ensure that users receive the most current information possible— for instance, where a Web page includes weather maps that track the direction of a moving storm. In long-distance learning, a course may be structured so that text pages advance at a pre-determined rate to accommodate the average reading speed of the target audience.

- Timed-response pages are slightly different. These pages require users to provide a response within a specified time period. Often, this feature is included for security reasons. If a user enters a secure site by submitting a user name and password, the user's "session" may automatically end if the user does not respond within a several minutes. A Web developer may incorporate this capability into a Web site by making a page appear that requires the user to hit a button within 30 seconds to prevent termination of the user's session.

Some users with physical disabilities may not have the manual dexterity or speed required to access a timed response page. Also, users with cognitive impairments or learning disabilities may not be able to comprehend material presented in a timed response page quickly enough to access the information before it is replaced by new information or a default screen.

Approximately 12% of the 3,028 Web pages surveyed (368 pages) reportedly contain auto-refreshing or timed-response features. Of these, 109 do not provide any alternative to these potentially inaccessible elements. See Table 12.

Question 17 asks whether the Web page is free from any blinking or updating of the screen that causes flicker. Checkpoint 7.1 of the WAI Guidelines explains the importance of this question:

> People with photosensitive epilepsy can have seizures triggered by flickering or flashing in the 4 to 59 flashes per second (Hertz) range with a peak sensitivity at 20 flashes per second as well as quick changes from dark to light (like strobe lights).

Therefore, this question relates to the usability of a Web page by users with some types of visually-induced seizure disorders.

Only approximately 5% of federal Web pages that were surveyed contain elements that would cause computer monitors to blink or flicker. See Table 13.

### E. Making the Most of Organizational Elements.

18. Is a fallback page provided for pages that contain frames?

21. If frames are used, are titles provided so that users can keep track of frames by name?

Questions 18 and 21 ask related questions about the use of "frames." Frames are used to "divide up" portions of a Web page to allow each portion of the page to have separate functions. Also, when a page "refreshes" with new information, only certain frames get refreshed. The advantage to this technique is that less information is transmitted at one time — thus improving the "speed" of the page, while simultaneously placing fewer demands on the server (the computer hardware creating and transmitting the Web pages to many different users). The Web page shown in Fig. 7 uses frames to create a separate portion of its page for commonly used functions or navigational links to other portions of its Web site:

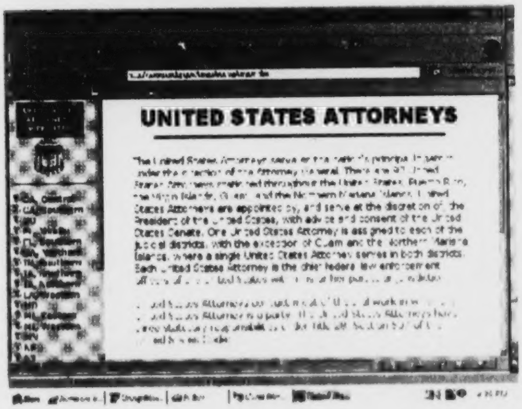
UNITED STATES ATTORNEYS

Figure 7

In this Web page, the names of U.S. Attorneys' Offices are listed on the left side of the screen. In a connected, but separate, window on the right side of the screen is text. When the user chooses one of the options on the left side of the screen, only the right portion of the screen changes and becomes filled with new content that reflects the user's choices. As is common with many documents including frames, different frames within the document have separate scroll bars that permit the user to scroll through the content of one frame without disturbing the viewable portion of the other frame.

While frames are useful as an organizational tool, they can present barriers to access for some people with disabilities. For instance, because each "frame" is a separate screen element, someone who cannot see the computer screen may not know which frame his or her screen reader or Braille display is reading from. Similarly, a person using screen enlargement software may encounter difficulties because of the layout of different frames on a screen. In addition, users with cognitive disabilities may have difficulty understanding the relationships between different frame elements.

Guideline 12 of the WAI Guidelines addresses this concern by stating that Web developers should "provide context and orientation information to help users understand complex pages or elements." As explained by the WAI Guidelines,

> Grouping elements and providing contextual information about the relationships between elements can be useful for all users. Complex relationships between parts of a page may be difficult for people with cognitive disabilities and people with visual disabilities to interpret.

Therefore, a "no" answer to Question 21 significantly affects the usability of a Web page by blind or visually impaired users and users with cognitive disabilities.

Another issue is that frames often cannot be accessed by older browsers. Like much of the Internet, frames were developed to enhance the appearance and usability of Web sites. Older Web browsers that were developed before the advent of frames, however, cannot "read" frames. When read with older browsers, Web pages with frames appear in an incomprehensible format. Unfortunately, many older browsers (particularly, "text only" browsers such as the popular Lynx browser) work extremely well with screen reader and Braille displays used by people who are blind or who have cognitive impairments or learning disabilities. The WAI Guidelines recognized this problem by recommending that Web developers "ensure that pages are accessible even when newer technologies are not supported or are turned off." Question 18 targets this concern by asking whether Web developers have created "frameless" alternate pages to pages that contain frames. Therefore, a "no" answer to Question 18 indicates that the page is inaccessible to some blind users, especially if they are using an older browser. In addition, it may also indicate that the page is less accessible to users with cognitive disabilities.

Overall, over 10% of federal Web pages surveyed by components (310 of 3,028) included frames without a fallback page, compared with 11% of framed pages (333) that were accompanied by non-framed fallback pages. Just over 7% of Web pages (224 of 3,028) used frames yet did not provide titles, compared with over 14% of pages that had frames which were titled. See Table 14.

### F. Using Scripts and Style Sheets.

19. For scripts that present critical information or functions, is an alternative, equivalent presentation or mechanism provided?

20. For pages that use style sheets, are the contents of each page ordered and structured so that they read appropriately without the style sheet?

"Scripts" are used by an increasing number of Web page developers to provide greater functionality to Web pages or to improve their usefulness. Like an "applet," a script is a programmed set of instructions that is sent to a user's computer when he visits a Web page. However, unlike an applet, a script is not "compiled" (a process which makes running the instruction set much faster and more efficient). As a consequence, a script runs more slowly than an applet, but is much easier to write. A script usually resides only in the computer's memory and is used to perform basic functions for the user. For instance, a script can be used to make sure that the user entered correct data in a form (so-called "data validation") or to provide a quick "look-up" to compare submitted information with a small collection of information downloaded with the Web page. The advantage to using scripts is the perceived "speed" of the Web site— because the information is already in the memory of the user's computer, an "extra trip" to the server isn't necessary for such simple tasks as data validation or look-ups. Scripts can also be used to improve the appearance and "coolness" of a Web site. A script can be used to make a graphic image transform into a different image when the user moves his or her mouse over the image (so-called "rollover gifs") and to create menus that pop up immediately when a user passes the mouse pointer over a button. Unfortunately, scripts also create a number of barriers to access because few of the functions are accessible to those who use screen readers or Braille displays. Therefore, without a means of providing alternative equivalent information or mechanisms that do not use scripts, the information or functions provided by scripts are not available to people who use these and other assistive technologies. Some scripts may also present barriers to users with manual dexterity problems. Scripts animating "rollover gifs" may require careful mouse placement to work and this level of dexterity may be impossible for some users with disabilities.

"Style sheets" are another recent development for the Internet. Style sheets are designed to simplify Web page design for Web page developers because they separate a page's "content" from its "form." Therefore, formatting instructions (such as indentations, fonts, table settings, and paragraph spacing) can be pre-defined and used by a number of separate Web pages on a Web site. In a nutshell, using style sheets makes it much easier for a Web page developer to create a consistent "look and feel" within a Web site and makes updating the site much easier. However, like scripts, style sheets also present barriers to access because only the newest browsers support style sheets. Assistive technologies such as screen readers and Braille displays are often more compatible with older browsers. Hence, the use of style sheets may create a page that is incomprehensible to visitors using browsers that do not support style sheets.[14]

Out of 3,028 Web pages surveyed, 271 did not include an equivalent alternative presentation for Web pages that used scripts. Furthermore, 112 Web pages could not be read appropriately if the user's computer did not support style sheets. See Table 15.

### G. Providing Text-Only Alternative Pages.

Sometimes, with current technology, it is impossible or extremely difficult to make certain Web pages are fully accessible to users with disabilities. In these circumstances, a so-called "text only" page may be the only alternative for a Web site designer. The WAI Guidelines recognize this reality in the discussion accompanying WAI Guideline 11:

> Content developers should only resort to alternative pages when other solutions fail because alternative pages are generally updated less often than "primary" pages. An out-of-date page may be as frustrating as one that is inaccessible since, in both cases, the information presented on the original page is unavailable. Automatically generating alternative pages may lead to more frequent updates, but content developers must still be careful to ensure that generated pages always make sense, and that users are able to navigate a site by following links on primary pages, alternative pages, or both. Before resorting to an alternative page, reconsider the design of the original page; making it accessible is likely to improve it for all users.

These concerns relate to all users with disabilities. However, most affected are users of screen readers and Braille displays, because text is easily converted into speech or Braille output. Questions 22, 23, and 24 relate to these concerns:

22. Do you provide a "text only" alternative page to the original page?

23. If you provide a "text only" alternative page, does it contain substantially the same information as the original page?

24. If you provide a "text only" alternative page, is it updated as often as the original page?

If a component was able to answer "yes" or "Not applicable" to Questions 1-21 for a particular Web page, all of the page's elements are presumably accessible and there is no need for an additional text-only page. Question 22 becomes much more relevant when one or more of the elements analyzed in Questions 1-21 is inaccessible.

Conversely, if text-only alternative pages are provided, they should be updated as often and contain the same information and links as the mainstream page. A "no" answer to either Question 23 or 24 indicates that some people with disabilities would be adversely affected. Federal components responding to Questions 23 and 24 indicated that less than 4% of Web pages surveyed (120 out of 3,028) included either problem identified in Questions 23 and 24. See Table 16.

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## II. *The Subjective Survey Tool: Using a Text-Only Browser and Other Assistive Technologies to Test Web Pages for Accessibility*

### A. Overview of Subjective Analysis of Web Pages

The focus of agencies' self-evaluation of the accessibility of their Web pages was carried out through the objective format questions in the Web Accessibility Checklist. Question 25 of the Checklist, however, was a subjective-format question that asked the agencies to view each of their evaluated Web pages using a text-only browser. Using the text-only browser as an evaluation tool was intended to have agencies experience — to some degree — what a person using a screen reader or refreshable Braille display would experience when accessing those same Web pages. Specifically, Question 25 asked:

> After you have evaluated this Web page using the Checklist, test it by running it with a text-only browser, such as Lynx, a public domain text browser that is available at http://lynx.browser.org. Describe the accessibility successes and problems you encountered during this exercise, including your plans for addressing any problems.

Many components chose to test their Web pages using utilities other than the public domain Lynx browser. Many used the interactive Web accessibility evaluation tool "BOBBY," which is provided and maintained free of charge by the Center for Applied Special Technology (CAST). Others evaluated their Web pages using IBM's Home Page Reader.

In addition, as part of their overall agency surveys, components were asked to subjectively evaluate the accessibility of their Web pages as a whole and describe any changes that they intended to implement to improve accessibility.

Of the 3,028 subjective Web responses provided to the Department, approximately 1,900 of them provided meaningful information. Thirty-two overall agency reports included useful information for making federal Web pages more accessible.

### B. Findings

In general, most federal agencies' Web pages are generally accessible to users with disabilities; many others can be made accessible relatively easily. Nevertheless, some serious challenges remain for federal agencies in making their Web pages accessible. As more forms and interactive content are put online, agencies will have to maintain their vigilance regarding accessibility.

*Overall subjective findings.* In 7 of the 32 overall agency reports and 862 component Web page evaluations, the components reported that their Web pages were generally accessible to text browsers, but gave little or no analysis of any identified problems. In 18 of the overall agency reports and 229 Web page evaluations, components indicated that their pages were generally accessible when viewed with a text browser and that any existing problems could be easily remedied. One hundred thirty Web pages were reportedly created in a text-only format and did not pose any accessibility problems when evaluated with the text-only browser. By contrast, only 19 Web page evaluations — and no overall agency reports — indicated that pages were completely inaccessible when viewed with a text-only browser. Components identified specific accessibility problems in the remaining Web pages and, for the most part, indicated that they would fix the accessibility problems.

*Alternative text.* The most common problems identified by components were:

- alternate text was missing from many graphics, and
- alternate text which was provided needed to be more descriptive.

These problems were identified as major — but easily remedied — shortcomings in 5 overall agency reports and 203 Web page evaluations. A related problem involved links, where images used as links did not contain adequate alternate text labels. This problem was encountered in 51 individual Web page evaluations. A second related problem involves the use of image maps without alternate text to explain the various portions of the map. This problem occurred in 51 Web pages evaluated by components. These problems are very easy to fix. All components that identified these issues recognized the need to correct them quickly.

*Tables.* Many agencies' Web sites contain tables. Simple tables are used to improve page layout or convey simple information; larger tables are used to convey more complex information. As noted in the objective analysis section, large tables can be extremely confusing for people who use screen readers and refreshable Braille displays. Some newer browsers — such as IBM's Home Page Reader — do a better job of rendering tables in a way that is comprehensible to persons who use assistive technologies. One overall agency report and 68 individual Web page evaluations recognized this problem as a major accessibility problem with their Web pages. In most cases, components indicated that they would provide textual summaries of the information contained in inaccessible tables.

*Frames.* Another problem encountered by users with disabilities is components' use of frames. In 54 component evaluations, testers identified the use of frames and, in some cases, specifically noted that the use of frames made these Web pages completely unreadable or unusable with a text browser. A user may not be confronted with a page that is difficult to understand — instead, the user is presented with a screen that may be completely blank. As a result of this survey, however, most components agreed to redesign their sites to address this problem. Agencies need not dispense with frames altogether, but they should provide pages that are comprehensible even when frames are turned off. That is, the easy solution is to provide a fall-back "no frames" option.

*Other potential barriers.* Four other common problems in Web page design were identified by the components. These included:

- JavaScript scripts that caused problems when using the Lynx browser;
- poor choices of colors (e.g., using color as the sole means of conveying information or poor combinations of background and foreground colors);
- inaccessible forms;[15] and
- inaccessible applets.

Each of these problems could make a Web page inaccessible to users with disabilities. In most cases, these problems can be solved by redesigning the Web page to add redundant, accessible features.

*Text-only alternate pages.* Some agencies believe that a more appropriate solution to ensuring the accessibility of their Internet pages involves creating text-only alternative Web sites specifically geared towards the needs of persons with disabilities. The final Access Board's Section 508 Standards may address whether providing text-only pages is an appropriate solution.

*Inaccessible content.* A more significant problem involves agencies' use of inaccessible content on their sites. An agency may create a Web page that is easily navigated by people using a text-only browser but then include downloadable files that are inherently inaccessible. This problem occurs most frequently with two types of file content used by many components – files rendered by scanning to Adobe Acrobat's portable document format (pdf) and multimedia files.

*Adobe's Portable Document Format (pdf).*[16] Many components mentioned in their evaluations that many of their Web pages included pdf files. Other agencies and components were more specific: 46 component evaluations and 3 overall agency reports noted that the presence of pdf files made certain pages useless to testers. In 24 other component evaluations and 3 agency reports, agencies also identified the accessibility problems created by pdf files and agreed to remedy these problems by including accessible content and, in some cases, removing pdf files from their Web sites. Other components, such as the Department of Justice's Civil Rights Division, frequently post pdf documents on their Web sites but routinely ensure that they are accompanied by accessible versions of the same document (usually in accessible HTML).[17] Other inaccessible formats in which some federal Web site information is presented include PowerPoint.[18] Adobe's pdf format, however, due to its sheer popularity, presents one of the most commonly-encountered and difficult obstacles for users with disabilities of federal Web pages.[19] A very high priority should be assigned to addressing this issue throughout federal agencies.[20]

Based on the information presented by Adobe and the Department of Education, agencies should refrain from posting files to their Web pages exclusively in pdf format. Agencies should accompany all pdf documents with accessible versions of the same document (i.e., in accessible HTML). Whenever possible, agencies using pdf are encouraged to use the "print" command rather than creating a pdf document by scanning it. If scanning is used, agencies are encouraged to use optical character recognition (OCR), where the document contains text.[21]

*Multimedia files*. Multimedia is another type of content that components have identified as causing accessibility problems. As technology has progressed, certain technologies for delivering multimedia content over the Internet have evolved to the point that individuals can download— or play in "real time" — multimedia movies. Although these file formats are extremely popular among commercial Web sites, they are relatively uncommon among federal agencies' Web sites. In fact, only 4 component evaluations and one overall agency evaluation noted the lack of audio descriptions in certain video files. Only 12 component evaluations and 2 overall agency reports noted the presence of inaccessible multimedia files.

Unlike pdf files, multimedia content is not simply an alternative to a paper document. Instead, multimedia pages include sound and synchronized video presentation. Therefore, in certain circumstances, it may not be possible to fully and accurately describe the content of such multimedia presentations through text. However, where agencies choose to use such presentations, they should endeavor to make them as accessible as possible.

## Recommendations

To address making federal agencies' Web pages more accessible, the Department recommends the following:

1. Testing Web Pages Before Posting. Each agency should evaluate for accessibility all of its new Web pages before they are posted. Existing Web pages should be tested as they are updated. Testing should be done with text-only browsers and, where possible, with assistive technology such as screen reading software to ensure that the experience of users with disabilities is comparable to that of others.

2. Agency Web Guidelines. Each agency that has developed style guidelines to maintain a consistent "look and feel" of its Web pages should review those guidelines to ensure that they will maximize the accessibility of the agency's Web pages.

3. The Government Printing Office (GPO). Many smaller agencies rely on the GPO for their Web site design and maintenance. While section 508 does not apply to the GPO, the GPO should provide leadership to ensure that all Web pages it develops or maintains are accessible.

4. Dedicated E-mail Addresses. Because most accessibility problems on agency Web sites result from oversight or lack of awareness of accessibility issues, rather than technical or design difficulty, each agency should prominently post to its Internet pages an e-mail address through which users with disabilities can inform the agency of any accessibility barriers encountered. Each agency should be responsive to any e-mails it receives regarding the accessibility of its Web site to people with disabilities.

5. Accessibility Information Logo. The National Endowment for the Arts, along with the Universal Access Working Group, GSA, and the Access Board, should develop an easy-to-recognize accessibility information logo (and alternative text label). Each agency should use this logo (and text label) to link people with disabilities who use its Web pages with appropriate accessibility instructions and information, including an e-mail address to the agency's accessibility point-of-contact.

6. Location of Accessibility Information. Where it makes sense to do so, such as when placing a link to a text-only alternate Web site or when posting the accessibility instruction logo and label, each agency should place accessibility information in the uppermost left-hand corner of its Web pages. This location will facilitate use of the agency's Web pages by people who use screen readers, as it is the first location from which a screen reader will read.

7. Document Formats. As agencies put more of their programs and services online, each must remain vigilant to ensure it is not inadvertently creating barriers for people with disabilities.

Online forms created using any of the various Web technologies pose significant accessibility challenges to Web designers. Documents rendered exclusively in Adobe's portable document format (pdf) or Microsoft's PowerPoint formats may raise particular concerns. If any posted documents or forms are less than fully accessible, each agency should also post ASCII or accessible HTML versions of the same documents, where possible. Where exclusive reliance on an inaccessible format is unavoidable, each agency should provide contact information where users with disabilities can request the underlying information in an accessible format, where doing so would not impose an undue burden on the agency or result in an fundamental alteration.

### *A Promising Practice: A Pilot Program of the Federal Election Commission*

Currently, the Federal Election Commission is participating in an experimental program employing emerging technology to provide alternate Web Access for those with disabilities. The FEC is working with The Organization for Alternate Access (http://www.altaccess.net) in a pilot program offering Web access for those with disabilities. A simplified version of the FEC's Web Page is provided through phone or TTY/TDD. The access numbers for this service are as follows:

Pre-Recorded Voice, Touch-Tone Input, (818) 995-2463

TTY/TDD (for the deaf), (818) 995-2464

Speech Synthesis, Touch-Tone Input, (818) 995-2462

The FEC plans to expand on its pilot program to provide alternative access to the Web by utilizing emerging technologies. As described above, the FEC is working with The Organization for Alternative Access to provide Internet content to those individuals without a computer. As described above a simplified version of the FEC's Web Page is provided through phone or TTY/TDD. The implementation utilizes a new technology called Media Independent Presentation Language (MIPL).

There are presently three active MIPL-enabled browsers which may be used by the public to obtain a sampling of MIPL technology. The browsers, provided in connection with the Federal Election Commission's pilot program are described as follows:

> Pre-Recorded Voice, Touch-Tone Input, (818) 995-2463: This browser, is based upon a Dialogic D41/X PC telephony interface card (circa 1990), and running on ISC (Interactive Systems Corp/Now Sunsoft) (SysVR3.2) UNIX.
>
> TTY/TDD (for the deaf), (818) 995-2464: This browser, is based upon a TTY/TDD compatible modem (45.5 baud Baudot, 110 and 300 baud ASCII), and running (on a serial port) on a FreeBSD UNIX system.
>
> Speech Synthesis, Touch-Tone Input, (818) 995-2462: This browser, is based upon a Digital Equipment Corp./Compaq DecTalk DTC-01 Speech Synthesizer (circa 1984), and running (on a serial port) on a Solaris X86 UNIX system. This version of the browser is still in development, and is by no means without deficiencies (such as buffer control issues). It does, however demonstrate the concept effectively.

Although this should not be considered an alternative to making agency Web pages accessible, it is a powerful reminder of how the Internet may affect our lives in the future. It also is a means of providing Internet content to all users, including those without access to computers.

A complete description of this technology is available on the Internet (http://www.altaccess.net).

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[1] This document is available on the Department of Justice's section 508 Web site (www.usdoj.gov/crt/508). People with disabilities may request copies in Braille, large print, or on computer disk by calling 1-800-514-0301 (voice) or 1-800-514-0383 (TTY).

[2] Popularity was measured by usage. If a component had no way to track usage, it was instructed to evaluate the top 20 pages in order of hierarchy: that is, those that could be accessed by the fewest number of links from the component's home page.

[3] The guidelines of the W3C's WAI are the result of a compilation and technical upgrading of a number of different Web accessibility guidelines from around the world. They are developed by a consensus process through a W3C working Group involving Web industry, disability organizations, research organizations, and governmental organizations.

The Department of Justice's Report has not been adopted, endorsed by, or in any way approved by the WAI, the W3C, or any component.

More information about the WAI and its products is available on the Internet (http://www.w3.org/WAI).

[4] The Department was careful to limit the degree and scope of conclusions drawn from the data provided by agencies, for the simple reason that many of the components appeared to misunderstand some of the questions. Spot-checks conducted by the Department of the Web sites — the URL's of which were reported on the survey forms — revealed that many of them did not contain the features the components identified them as containing. For instance, 592 Web pages were identified as containing "applets." The Department, after reviewing a majority of these pages, did not find a single applet in a spot-check of most of them.

There are many possible explanations for this observation. It is possible that as components identified accessibility problems with certain types of features (e.g., applets), they deleted the offending features from their Web pages rather than making them accessible. It is more likely, however, that many of those who evaluated Web pages were not sufficiently careful or knowledgeable to correctly identify features of their Web pages.

[5] Because of these categories, some survey questions appear out of order in this Report.

[6] This is consistent with Guideline 1 of the WAI Web Content Accessibility Guidelines (WAI Guidelines, version 1.0).

[7] Accompanying this analysis are 3 sets of appendices, which include tables and descriptions of the data provided by the agencies. These Web Appendices can be summarized as follows:

- *Web Appendix A* includes the tables specifically mentioned in the text of this Report. Unless otherwise indicated, all references to tables refer to tables in Appendix A.

- *Web Appendix B* includes a summary of all responses to each question by the agencies, arranged according to the type of agency (e.g., cabinet level, large, medium, small, and very small).

- *Web Appendix C* includes a summary of all responses by the agencies, arranged according to the type of Web page reviewed (e.g., online form for services or benefits, employment postings, description of activities, etc.).

[8] Currently, applets are written in the Java™ programming language. Sun Microsystems, the creators of Java, provides background information and technical assistance in creating and using applets in Java through their Web site (http://www.java.sun.com).

[9] Of the 2436 Web pages surveyed, components answered "not applicable," presumably indicating that those pages did not contain applets.

[10] Reviewers may have confused JavaScript scripts (which were found on many of these pages) for Java applets. JavaScript and Java are two distinct programming languages.

[11] NHTSA uses the "dashboard" image map, Fig. 3, extensively throughout its Web site. In the past, NHTSA had inadvertently omitted to provide alternative text links each time the "dashboard" image map appeared on its site. The significance to persons with disabilities was that once they were on a NHTSA page where navigation could only be performed through the "dashboard"

image map, people who are blind, deaf-blind, those who have significant low vision, many with cognitive impairments or learning disabilities, and anyone with a disability affecting manual dexterity who cannot use a computer mouse was unable to use *any* of the functions that were available to the nondisabled user through the dashboard image map: "touring" NHTSA, going to the NHTSA home page, looking at "hot" and "new" items, accessing the Auto Safety Hotline, using the search function, or going to the "Cars" or "People" pages within the NHTSA Web site. NHTSA immediately corrected this problem as soon as the Department of Justice brought it to NHTSA's attention. Now, wherever the NHTSA "dashboard" image map appears, it is accompanied by alternative text links, giving people with disabilities equal access to the functions activated through the image map.

[12] Question 6 also relates to WAI Guideline 13, which states, "Provide clear and consistent navigation mechanisms – orientation information, navigation bars, a site map, etc.– to increase the likelihood that a person will find what they are looking for at a site."

[13] Questions 14 and 15 follow the principles outlined in Guideline 2 of the WAI Guidelines, which states:

> Ensure that text and graphics are understandable when viewed without color.

As explained by the WAI Guidelines,

> If color alone is used to convey information, people who cannot differentiate between certain colors and users with devices that have non-color or non-visual displays will not receive the information. When foreground and background colors are too close to the same hue, they may not provide sufficient contrast when viewed using monochrome displays or by people with different types of color deficits.

[14] While style sheets may create barriers for some users, other users may use style sheets to actually improve the accessibility of Web pages. Some very modern browsers allow users to create their own style sheets that will be used for any Web pages visited by the user. These style sheets can be used, for instance, by a user with low-vision to ensure that all text on a page is in 18-point, sans serif, black letters on a white background. Web designers should always provide a fall back pages that do not require the user's Internet browser to support style sheets.

[15] For security reasons and to promote forms which are electronically scannable, many agencies use Adobe's portable document format (pdf) to post forms to their Internet pages. However, use of pdf poses a substantial barrier to many people with disabilities. Thus, agencies should always accompany pdf forms with alternate, accessible forms. Agencies may indicate that only those for whom the "mainstream" forms are inaccessible are authorized to use the accessible (non-scannable) versions of the form.

[16] pdf documents can be created in different ways; each has implications for accessibility. One method to create pdf documents is to scan an image to create a pdf file directly. Unfortunately, these so-called "PDF Image Only" files are essentially graphic representations of the documents and, like photographs with no associated text, are completely unreadable by screen reader technology (some files can be converted into searchable text using optical character recognition techology, but this technology yields inconsistent results). A second way to create pdf files is to print directly to pdf format. While this option does create text that is readable by screen readers, it still suffers from many of the shortcomings identified by the Department of Education.

[17] Recently, in a presentation to federal agency officials and employees, representatives from Adobe explained that their newly released version of Adobe Acrobat included many accessibility features that, if used correctly, could be used to create files that were easily accessible to users with disabilities. Adobe's Accessibility Seminar, Feb. 2, 2000, IRS Building. Word processed documents that are "printed" to pdf instead of "scanned" to pdf are much more likely to work well with Adobe's access utility. Adobe clarified that it sees its job as simply to provide the tools for making accessible files, not to teach users how to use these tools to make files more accessible.

Several audience members commented that in light of section 508's requirements, Adobe should integrate into the software it is marketing to federal agencies inaccessibility flags that would warn users when they were using the software in such as way that would result in inaccessible content.

[18]Other agencies have included other file formats that they have found to be inaccessible. In 20 component evaluations and 2 overall agency reports, agencies noted the presence of other specialized file formats that were inaccessible to users with disabilities. Among these other file formats, Microsoft PowerPoint files were identified in many of these reports. Microsoft PowerPoint is not as commonly used as pdf files for two reasons. First, Microsoft PowerPoint is a application designed specifically for making visual presentations, often for large groups of users, and not for recording information for dissemination to others. Second, use of the PowerPoint files requires owning a copy of Microsoft PowerPoint to view or use the files for presentations.

[19]Adobe Acrobat pdf files are specifically intended as a way of distributing information and can be read using a free reader program available from Adobe. Pdf is a very popular means of disseminating information. In a recent speech, John Warnock, founder and CEO of Adobe Systems, noted that Adobe Acrobat's free reader software is downloaded approximately 1.1 million times each week.

[20] In its July 22, 1999, overall agency report, the Department of Education summarized the accessibility challenges faced by agencies choosing to put documents in older versions of Adobe Acrobat's pdf format:

> The Portable Document Format (PDF) has provided one of the most controversial accessibility problems of the decade. PDF documents, by the nature of the medium, are portable, cross-platform, generally tamper-proof, and render in exacting detail, representations of the original print document's fonts, formatting, etc.
>
> Unfortunately, documents displayed by the Adobe suite of products are totally unusable by those using screen reader technology to retrieve information from a computer display. Approximately three years ago, Adobe released a beta version of a plug-in, designed to convert PDF documents into text/HTML, thus rendering them available to screen reader users.
>
> Unfortunately, this plug-in, despite numerous claims, often crashed, was difficult to install and use, and produced unreadable text, except in the simplest of documents which had no columns, tables, or other complex formats.
>
> The availability of the plug-in has unfortunately misled many individuals into believing that PDF-only posting of documents is an acceptable means of providing documents in accessible formats. This is simply not the case, and we have, through our Internet Working Group, established a general policy of posting documents in PDF and HTML, or PDF and text as appropriate.
>
> We understand that over the next year or two, this bleak prospect for the accessibility of PDF documents should change. With the release of PDF 1.3 in Acrobat 4.0, the PDF format will now contain metadata that will provide more information on the document's logical structure so that accessibility conversion tools can render a more exact representation of the original document when converting to text or HTML.
>
> However, this will take some time, and will not happen until authors begin to utilize this increased logical structure metadata, and the accessibility conversion tools incorporate the ability to interpret this metadata in a meaningful manner.
>
> Ideally, the accessibility plug-in will eventually be built into Acrobat Reader, enabling a smooth and seamless utilization of the Reader by sighted individuals and those using screen readers, without the need for intervening plug-in software. Until these things take place, we must judge the Acrobat Reader as inaccessible and not in compliance with the intent of section 508.

Department of Education's Overall Agency Evaluation.

[21]There are many times when printing to pdf or using OCR is not practical, such as when an agency is posting an electronic representation of artwork, a photograph, or other non-textual content. Non-text content should be accompanied by text descriptions.

*Web Appendix A*[1]

## Data Tables

| Table 1: Web Pages that Include Images Without Alternative Text (Q1) | |
|---|---|
| **Type of Agency** | **Number / Total** |
| Overall (All Agencies) | 881 / 3028 |
| Cabinet Level Agencies | 534 / 1686 |
| All Large Agencies | 154 / 401 |
| All Medium Agencies | 63 / 334 |
| All Small Agencies | 71 / 370 |
| All Very Small Agencies | 59 / 237 |

| Table 2: Web Pages that Include Image Maps Without Alternative Text (Q3) | |
|---|---|
| **Type of Agency** | **Number / Total** |
| Overall (All Agencies) | 321 / 3028 |
| Cabinet Level Agencies | 173 / 1686 |
| All Large Agencies | 73 / 401 |
| All Medium Agencies | 32 / 334 |
| All Small Agencies | 37 / 370 |
| All Very Small Agencies | 6 / 237 |

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[1] This document is available on the Department of Justice's section 508 Web site (www.usdoj.gov/crt/508). People with disabilities may request copies in Braille, large print, or on computer disk by calling 1-800-514-0301 (voice) or 1-800-514-0383 (TTY).

| Table 3: Web Pages that Include Server-Side Image Maps Without Text Links for Each Hotspot in the Image Map (Q4) | |
|---|---|
| **Type of Agency** | **Number / Total** |
| Overall (All Agencies) | 203 / 3028 |
| Cabinet Level Agencies | 99 / 1686 |
| All Large Agencies | 31 / 401 |
| All Medium Agencies | 44 / 334 |
| All Small Agencies | 22 / 370 |
| All Very Small Agencies | 7 / 237 |

**Table 4: Text Links and Alternative Text For Web Pages with Image Maps**

| **Problem Identified** | **Overall** | **Cabinet Agencies** | **Large Agencies** | **Medium Agencies** | **Small Agencies** | **Very Small Agencies** |
|---|---|---|---|---|---|---|
| Question 3 [illegible] only) | 321 / 3028 | 173 / 1686 | 73 / 401 | 32 / 334 | 37 / 370 | 6 / 237 |
| Question 4 (no only) | 203 / 3028 | 99 / 1686 | 31 / 401 | 44 / 334 | 22 / 370 | 7 / 237 |
| **Surveyed items that did not meet all of the above survey questions** | 97 / 3028 | 57 / 1686 | 26 / 401 | 7 / 334 | 1 / 370 | 6 / 237 |
| **Surveyed items that did not meet one or more of the above survey questions** | 427 / 3028 | 215 / 1686 | 78 / 401 | 69 / 334 | 58 / 370 | 7 / 237 |

**Table 5: Web Pages that Did Not Provide Alternative Text for Graphical Buttons (Q5)**

| Type of Agency | Number / Total |
|---|---|
| Overall (All Agencies) | 352 / 3028 |
| Cabinet Level Agencies | 188 / 1686 |
| All Large Agencies | 50 / 401 |
| All Medium Agencies | 41 / 334 |
| All Small Agencies | 57 / 370 |
| All Very Small Agencies | 16 / 237 |

**Table 6: Web Pages that Did Not Provide a Long Description of Graphics Conveying Important Information (Q8)**

| Type of Agency | Number / Total |
|---|---|
| Overall (All Agencies) | 777 / 3028 |
| Cabinet Level Agencies | 409 / 1686 |
| All Large Agencies | 99 / 401 |
| All Medium Agencies | 92 / 334 |
| All Small Agencies | 149 / 370 |
| All Very Small Agencies | 28 / 237 |

| Table 7: Web Pages that Include Short Animations or Movies without Alternative Text, Long Descriptions, or Auditory Descriptions | | | | | | |
|---|---|---|---|---|---|---|
| **Problem Identified** | **Overall** | **Cabinet Agencies** | **Large Agencies** | **Medium Agencies** | **Small Agencies** | **Very Small Agencies** |
| Question 12 (no only) | 155 / 3028 | 85 / 1686 | 46 / 401 | 4 / 334 | 10 / 370 | 10 / 237 |
| Question 13 (no only) | 102 / 3028 | 65 / 1686 | 22 / 401 | 5 / 334 | 3 / 370 | 7 / 237 |
| **Surveyed items that did not meet all of the above survey questions** | 43 / 3028 | 17 / 1686 | 17 / 401 | 3 / 334 | 0 / 370 | 6 / 237 |
| **Surveyed items that did not meet one or more of the above survey questions** | 214 / 3028 | 133 / 1686 | 51 / 401 | 6 / 334 | 13 / 370 | 11 / 237 |

| **Table 8: Web Pages Include Features that are Inaccessible to Persons with Disabilities Affecting Vision** | | | | | | |
|---|---|---|---|---|---|---|
| **Problem Identified** | **Overall** | **Cabinet Agencies** | **Large Agencies** | **Medium Agencies** | **Small Agencies** | **Very Small Agencies** |
| Question 1 (no only) | 881 / 3028 | 534 / 1686 | 154 / 401 | 63 / 334 | 71 / 370 | 59 / 237 |
| Question 3 (no only) | 321 / 3028 | 173 / 1686 | 73 / 401 | 32 / 334 | 37 / 370 | 6 / 237 |
| Question 4 (no only) | 203 / 3028 | 99 / 1686 | 31 / 401 | 44 / 334 | 22 / 370 | 7 / 237 |
| Question 5 (no only) | 352 / 3028 | 188 / 1686 | 50 / 401 | 41 / 334 | 57 / 370 | 16 / 237 |
| Question 8 (no only) | 777 / 3028 | 409 / 1686 | 99 / 401 | 92 / 334 | 149 / 370 | 28 / 237 |
| Question 12 (no only) | 155 / 3028 | 85 / 1686 | 46 / 401 | 4 / 334 | 10 / 370 | 10 / 237 |
| Question 13 (no only) | 102 / 3028 | 65 / 1686 | 22 / 401 | 5 / 334 | 3 / 370 | 7 / 237 |
| **Surveyed items that did not meet all of the above survey questions** | 15 / 3028 | 8 / 1686 | 0 / 401 | 1 / 334 | 0 / 370 | 6 / 237 |
| **Surveyed items that did not meet one or more of the above survey questions** | 1422 / 3028 | 787 / 1686 | 201 / 401 | 162 / 334 | 192 / 370 | 80 / 237 |

| **Table 9: Web Pages that Do Not Provide Textual Transcripts for Stand-Alone Audio Files and Significant Sounds (Q9)** | |
|---|---|
| **Type of Agency** | **Number / Total** |
| Overall (All Agencies) | 79 / 3028 |
| Cabinet Level Agencies | 33 / 1686 |
| All Large Agencies | 29 / 401 |
| All Medium Agencies | 7 / 334 |
| All Small Agencies | 2 / 370 |
| All Very Small Agencies | 8 / 237 |

| **Table 10: Web Pages That Did Not Provide Captions Synchronized with Video Output (Q10)** | |
|---|---|
| **Type of Agency** | **Number / Total** |
| Overall (All Agencies) | 77 / 3028 |
| Cabinet Level Agencies | 26 / 1686 |
| All Large Agencies | 20 / 401 |
| All Medium Agencies | 23 / 334 |
| All Small Agencies | 1 / 370 |
| All Very Small Agencies | 7 / 237 |

| **Table 11: Web Pages that Did Not Provide Sufficient Contrast Between Foreground and Background Colors (Q15)** | |
|---|---|
| **Type of Agency** | **Number / Total** |
| Overall (All Agencies) | 162 / 3028 |
| Cabinet Level Agencies | 110 / 1686 |
| All Large Agencies | 15 / 401 |
| All Medium Agencies | 5 / 334 |
| All Small Agencies | 23 / 370 |
| All Very Small Agencies | 9 / 237 |

| **Table 12: Web Pages that Did Not Provide Alternative Pages Without Timed-Responses or Auto-Refreshing (Q16)** | |
|---|---|
| **Type of Agency** | **Number / Total** |
| Overall (All Agencies) | 109 / 3028 |
| Cabinet Level Agencies | 59 / 1686 |
| All Large Agencies | 31 / 401 |
| All Medium Agencies | 8 / 334 |
| All Small Agencies | 5 / 370 |
| All Very Small Agencies | 6 / 237 |

| Table 13: Web Pages that are not Free of Blinking or Updating of the Screen that Causes Flicker (Q17) | |
|---|---|
| **Type of Agency** | **Number / Total** |
| Overall (All Agencies) | 151 / 3028 |
| Cabinet Level Agencies | 82 / 1686 |
| All Large Agencies | 48 / 401 |
| All Medium Agencies | 1 / 334 |
| All Small Agencies | 11 / 370 |
| All Very Small Agencies | 9 / 237 |

**Table 14: Web Pages that are Inaccessible Because of the Use of Frames**

| Problem Identified | Overall | Cabinet Agencies | Large Agencies | Medium Agencies | Small Agencies | Very Small Agencies |
|---|---|---|---|---|---|---|
| Question 18 (no only) | 310 / 3028 | 153 / 1686 | 36 / 401 | 10 / 334 | 49 / 370 | 62 / 237 |
| Question 21 (no only) | 224 / 3028 | 101 / 1686 | 31 / 401 | 14 / 334 | 48 / 370 | 30 / 237 |
| **Surveyed items that did not meet all of the above survey questions** | 167 / 3028 | 59 / 1686 | 28 / 401 | 7 / 334 | 45 / 370 | 28 / 237 |
| **Surveyed items that did not meet one or more of the above survey questions** | 367 / 3028 | 195 / 1686 | 39 / 401 | 17 / 334 | 52 / 370 | 64 / 237 |

**Table 15: Web Pages that are Inaccessible Due to the Use of Scripts or Style Sheets**

| Problem Identified | Overall | Cabinet Agencies | Large Agencies | Medium Agencies | Small Agencies | Very Small Agencies |
|---|---|---|---|---|---|---|
| Question 19 (no only) | 271 / 3028 | 137 / 1686 | 42 / 401 | 43 / 334 | 38 / 370 | 11 / 237 |
| Question 20 (no only) | 112 / 3028 | 34 / 1686 | 23 / 401 | 1 / 334 | 27 / 370 | 27 / 237 |
| **Surveyed items that did not meet all of the above survey questions** | 47 / 3028 | 16 / 1686 | 21 / 401 | 1 / 334 | 2 / 370 | 7 / 237 |
| **Surveyed items that did not meet one or more of the above survey questions** | 336 / 3028 | 155 / 1686 | 44 / 401 | 43 / 334 | 63 / 370 | 31 / 237 |

| Table 16: "Text Only" Web Pages that do not Provide Substantially Identical Information as "Mainstream" Pages | | | | | | |
|---|---|---|---|---|---|---|
| **Problem Identified** | **Overall** | **Cabinet Agencies** | **Large Agencies** | **Medium Agencies** | **Small Agencies** | **Very Small Agencies** |
| Question 23 (no only) | 86 / 3028 | 35 / 1686 | 17 / 401 | 6 / 334 | 20 / 370 | 8 / 237 |
| Question 24 (no only) | 103 / 3028 | 48 / 1686 | 16 / 401 | 11 / 334 | 20 / 370 | 8 / 237 |
| **Surveyed items that did not meet all of the above survey questions** | 69 / 3028 | 25 / 1686 | 13 / 401 | 5 / 334 | 19 / 370 | 7 / 237 |
| **Surveyed items that did not meet one or more of the above survey questions** | 120 / 3028 | 58 / 1686 | 20 / 401 | 12 / 334 | 21 / 370 | 9 / 237 |

*Web Appendix B*[1]

## Question-by-Question Responses to the Web Page Accessibility Checklist: Statistics by Type of Web Page

Note: Because some web pages were not categorized, the total number of web pages in these charts is 3,010 instead of 3,028.

| **Question 1**: For all images, is alternative text provided? | | | |
|---|---|---|---|
| **Type of Web Page** | **Yes** | **No** | **Not Applicable** |
| Description of activities | 724 / 1189 (60.9%) | 352 / 1189 (29.6%) | 113 / 1189 (9.5%) |
| Employment postings | 48 / 78 (61.5%) | 21 / 78 (26.9%) | 9 / 78 (11.5%) |
| Inherently graphical content (e.g., map or photograph) | 54 / 77 (70.1%) | 21 / 77 (27.3%) | 2 / 77 (2.6%) |
| Instructions for receipt of services or benefits | 147 / 221 (66.5%) | 51 / 221 (23.1%) | 23 / 221 (10.4%) |
| Online form for services or benefits | 41 / 91 (45.1%) | 38 / 91 (41.8%) | 12 / 91 (13.2%) |
| Other online form | 60 / 91 (65.9%) | 17 / 91 (18.7%) | 14 / 91 (15.4%) |
| Other | 759 / 1263 (60.1%) | 379 / 1263 (30%) | 125 / 1263 (9.9%) |

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[1] This document is available on the Department of Justice's section 508 Web site (www.usdoj.gov/crt/508). People with disabilities may request copies in Braille, large print, or on computer disk by calling 1-800-514-0301 (voice) or 1-800-514-0383 (TTY).

**Question 2**: For all applets, are alternative text and content provided?

| **Type of Web Page** | **Yes** | **No** | **Not Applicable** |
|---|---|---|---|
| Description of activities | 176 / 1189 (14.8%) | 102 / 1189 (8.6%) | 911 / 1189 (76.6%) |
| Employment postings | 14 / 78 (17.9%) | 5 / 78 (6.4%) | 59 / 78 (75.6%) |
| Inherently graphical content (e.g., map or photograph) | 14 / 77 (18.2%) | 8 / 77 (10.4%) | 55 / 77 (71.4%) |
| Instructions for receipt of services or benefits | 49 / 221 (22.2%) | 6 / 221 (2.7%) | 166 / 221 (75.1%) |
| Online form for services or benefits | 15 / 91 (16.5%) | 24 / 91 (26.4%) | 52 / 91 (57.1%) |
| Other online form | 13 / 91 (14.3%) | 2 / 91 (2.2%) | 76 / 91 (83.5%) |
| Other | 79 / 1263 (6.3%) | 80 / 1263 (6.3%) | 1104 / 1263 (87.4%) |

**Question 3**: For all image map links, is alternative text provided?

| **Type of Web Page** | **Yes** | **No** | **Not Applicable** |
|---|---|---|---|
| Description of activities | 416 / 1189 (35%) | 98 / 1189 (8.2%) | 675 / 1189 (56.8%) |
| Employment postings | 32 / 78 (41%) | 6 / 78 (7.7%) | 40 / 78 (51.3%) |
| Inherently graphical content (e.g., map or photograph) | 43 / 77 (55.8%) | 11 / 77 (14.3%) | 23 / 77 (29.9%) |
| Instructions for receipt of services or benefits | 101 / 221 (45.7%) | 9 / 221 (4.1%) | 111 / 221 (50.2%) |
| Online form for services or benefits | 29 / 91 (31.9%) | 27 / 91 (29.7%) | 35 / 91 (38.5%) |
| Other online form | 26 / 91 (28.6%) | 8 / 91 (8.8%) | 57 / 91 (62.6%) |
| Other | 319 / 1263 (25.3%) | 161 / 1263 (12.7%) | 783 / 1263 (62%) |

**Question 4**: If server-side image maps were used, are text links provided for each hotspot in the image map?

| **Type of Web Page** | **Yes** | **No** | **Not Applicable** |
|---|---|---|---|
| Description of activities | 202 / 1189 (17%) | 78 / 1189 (6.6%) | 909 / 1189 (76.5%) |
| Employment postings | 22 / 78 (28.2%) | 2 / 78 (2.6%) | 54 / 78 (69.2%) |
| Inherently graphical content (e.g., map or photograph) | 15 / 77 (19.5%) | 12 / 77 (15.6%) | 50 / 77 (64.9%) |
| Instructions for receipt of services or benefits | 32 / 221 (14.5%) | 33 / 221 (14.9%) | 156 / 221 (70.6%) |
| Online form for services or benefits | 5 / 91 (5.5%) | 3 / 91 (3.3%) | 83 / 91 (91.2%) |
| Other online form | 8 / 91 (8.8%) | 5 / 91 (5.5%) | 78 / 91 (85.7%) |
| Other | 164 / 1263 (13%) | 69 / 1263 (5.5%) | 1030 / 1263 (81.6%) |

**Question 5**: For all graphical buttons, is alternative text provided?

| **Type of Web Page** | **Yes** | **No** | **Not Applicable** |
|---|---|---|---|
| Description of activities | 771 / 1189 (64.8%) | 120 / 1189 (10.1%) | 298 / 1189 (25.1%) |
| Employment postings | 43 / 78 (55.1%) | 7 / 78 (9%) | 28 / 78 (35.9%) |
| Inherently graphical content (e.g., map or photograph) | 48 / 77 (62.3%) | 7 / 77 (9.1%) | 22 / 77 (28.6%) |
| Instructions for receipt of services or benefits | 123 / 221 (55.7%) | 31 / 221 (14%) | 67 / 221 (30.3%) |
| Online form for services or benefits | 41 / 91 (45.1%) | 28 / 91 (30.8%) | 22 / 91 (24.2%) |
| Other online form | 57 / 91 (62.6%) | 11 / 91 (12.1%) | 23 / 91 (25.3%) |
| Other | 727 / 1263 (57.6%) | 147 / 1263 (11.6%) | 389 / 1263 (30.8%) |

**Question 6**: Is there an absence of ASCII art, and, instead, are images and alternative text used?

| **Type of Web Page** | **Yes** | **No** | **Not Applicable** |
|---|---|---|---|
| Description of activities | 708 / 1189 (59.5%) | 100 / 1189 (8.4%) | 381 / 1189 (32%) |
| Employment postings | 49 / 78 (62.8%) | 1 / 78 (1.3%) | 28 / 78 (35.9%) |
| Inherently graphical content (e.g., map or photograph) | 45 / 77 (58.4%) | 4 / 77 (5.2%) | 28 / 77 (36.4%) |
| Instructions for receipt of services or benefits | 135 / 221 (61.1%) | 12 / 221 (5.4%) | 74 / 221 (33.5%) |
| Online form for services or benefits | 56 / 91 (61.5%) | 3 / 91 (3.3%) | 32 / 91 (35.2%) |
| Other online form | 58 / 91 (63.7%) | 1 / 91 (1.1%) | 32 / 91 (35.2%) |
| Other | 764 / 1263 (60.5%) | 34 / 1263 (2.7%) | 465 / 1263 (36.8%) |

**Question 7**: If OBJECT was used to incorporate an image, applet, or script into a page, is the information also conveyed in an alternative means in cases where the OBJECT cannot be perceived, such as with "title" or within the body of the OBJECT element?

| **Type of Web Page** | **Yes** | **No** | **Not Applicable** |
|---|---|---|---|
| Description of activities | 133 / 1189 (11.2%) | 91 / 1189 (7.7%) | 965 / 1189 (81.2%) |
| Employment postings | 10 / 78 (12.8%) | 4 / 78 (5.1%) | 64 / 78 (82.1%) |
| Inherently graphical content (e.g., map or photograph) | 13 / 77 (16.9%) | 3 / 77 (3.9%) | 61 / 77 (79.2%) |
| Instructions for receipt of services or benefits | 15 / 221 (6.8%) | 8 / 221 (3.6%) | 198 / 221 (89.6%) |
| Online form for services or benefits | 3 / 91 (3.3%) | 8 / 91 (8.8%) | 80 / 91 (87.9%) |
| Other online form | 10 / 91 (11%) | 1 / 91 (1.1%) | 80 / 91 (87.9%) |
| Other | 138 / 1263 (10.9%) | 54 / 1263 (4.3%) | 1071 / 1263 (84.8%) |

**Question 8**: Are long descriptions provided of all graphics that convey important information? To do so: use "longdesc."

| **Type of Web Page** | **Yes** | **No** | **Not Applicable** |
|---|---|---|---|
| Description of activities | 185 / 1189 (15.6%) | 315 / 1189 (26.5%) | 689 / 1189 (57.9%) |
| Employment postings | 14 / 78 (17.9%) | 18 / 78 (23.1%) | 46 / 78 (59%) |
| Inherently graphical content (e.g., map or photograph) | 11 / 77 (14.3%) | 37 / 77 (48.1%) | 29 / 77 (37.7%) |
| Instructions for receipt of services or benefits | 35 / 221 (15.8%) | 48 / 221 (21.7%) | 138 / 221 (62.4%) |
| Online form for services or benefits | 9 / 91 (9.9%) | 39 / 91 (42.9%) | 43 / 91 (47.3%) |
| Other online form | 12 / 91 (13.2%) | 11 / 91 (12.1%) | 68 / 91 (74.7%) |
| Other | 146 / 1263 (11.6%) | 305 / 1263 (24.1%) | 812 / 1263 (64.3%) |

**Question 9:** For stand-alone audio files, are textual transcripts of all words spoken or sung as well as all significant sounds provided?

| **Type of Web Page** | **Yes** | **No** | **Not Applicable** |
|---|---|---|---|
| Description of activities | 37 / 1189 (3.1%) | 37 / 1189 (3.1%) | 1115 / 1189 (93.8%) |
| Employment postings | 0 / 78 (0%) | 1 / 78 (1.3%) | 77 / 78 (98.7%) |
| Inherently graphical content (e.g., map or photograph) | 3 / 77 (3.9%) | 1 / 77 (1.3%) | 73 / 77 (94.8%) |
| Instructions for receipt of services or benefits | 16 / 221 (7.2%) | 1 / 221 (0.5%) | 204 / 221 (92.3%) |
| Online form for services or benefits | 3 / 91 (3.3%) | 0 / 91 (0%) | 88 / 91 (96.7%) |
| Other online form | 2 / 91 (2.2%) | 0 / 91 (0%) | 89 / 91 (97.8%) |
| Other | 49 / 1263 (3.9%) | 38 / 1263 (3%) | 1176 / 1263 (93.1%) |

**Question 10**: For audio associated with video, are captions — textual transcripts of dialog and sounds— synchronized with the video?

| **Type of Web Page** | **Yes** | **No** | **Not Applicable** |
|---|---|---|---|
| Description of activities | 38 / 1189 (3.2%) | 17 / 1189 (1.4%) | 1134 / 1189 (95.4%) |
| Employment postings | 0 / 78 (0%) | 0 / 78 (0%) | 78 / 78 (100%) |
| Inherently graphical content (e.g., map or photograph) | 3 / 77 (3.9%) | 1 / 77 (1.3%) | 73 / 77 (94.8%) |
| Instructions for receipt of services or benefits | 1 / 221 (0.5%) | 15 / 221 (6.8%) | 205 / 221 (92.8%) |
| Online form for services or benefits | 0 / 91 (0%) | 3 / 91 (3.3%) | 88 / 91 (96.7%) |
| Other online form | 1 / 91 (1.1%) | 1 / 91 (1.1%) | 89 / 91 (97.8%) |
| Other | 45 / 1263 (3.6%) | 39 / 1263 (3.1%) | 1179 / 1263 (93.3%) |

**Question 11**: Where sounds are played automatically, are visual notification and transcripts provided?

| **Type of Web Page** | **Yes** | **No** | **Not Applicable** |
|---|---|---|---|
| Description of activities | 19 / 1189 (1.6%) | 38 / 1189 (3.2%) | 1132 / 1189 (95.2%) |
| Employment postings | 0 / 78 (0%) | 3 / 78 (3.8%) | 75 / 78 (96.2%) |
| Inherently graphical content (e.g., map or photograph) | 1 / 77 (1.3%) | 3 / 77 (3.9%) | 73 / 77 (94.8%) |
| Instructions for receipt of services or benefits | 0 / 221 (0%) | 1 / 221 (0.5%) | 220 / 221 (99.5%) |
| Online form for services or benefits | 0 / 91 (0%) | 1 / 91 (1.1%) | 90 / 91 (98.9%) |
| Other online form | 1 / 91 (1.1%) | 0 / 91 (0%) | 90 / 91 (98.9%) |
| Other | 39 / 1263 (3.1%) | 25 / 1263 (2%) | 1199 / 1263 (94.9%) |

**Question 12**: For short animations such as animated "gifs" images, are alternative text and a long description provided, if needed?

| Type of Web Page | Yes | No | Not Applicable |
|---|---|---|---|
| Description of activities | 118 / 1189 (9.9%) | 79 / 1189 (6.6%) | 992 / 1189 (83.4%) |
| Employment postings | 5 / 78 (6.4%) | 6 / 78 (7.7%) | 67 / 78 (85.9%) |
| Inherently graphical content (e.g., map or photograph) | 14 / 77 (18.2%) | 6 / 77 (7.8%) | 57 / 77 (74%) |
| Instructions for receipt of services or benefits | 26 / 221 (11.8%) | 7 / 221 (3.2%) | 188 / 221 (85.1%) |
| Online form for services or benefits | 17 / 91 (18.7%) | 2 / 91 (2.2%) | 72 / 91 (79.1%) |
| Other online form | 4 / 91 (4.4%) | 1 / 91 (1.1%) | 86 / 91 (94.5%) |
| Other | 135 / 1263 (10.7%) | 53 / 1263 (4.2%) | 1075 / 1263 (85.1%) |

**Question 13**: For movies, are auditory descriptions provided and synchronized with the original audio?

| Type of Web Page | Yes | No | Not Applicable |
|---|---|---|---|
| Description of activities | 18 / 1189 (1.5%) | 27 / 1189 (2.3%) | 1144 / 1189 (96.2%) |
| Employment postings | 0 / 78 (0%) | 5 / 78 (6.4%) | 73 / 78 (93.6%) |
| Inherently graphical content (e.g., map or photograph) | 2 / 77 (2.6%) | 2 / 77 (2.6%) | 73 / 77 (94.8%) |
| Instructions for receipt of services or benefits | 15 / 221 (6.8%) | 2 / 221 (0.9%) | 204 / 221 (92.3%) |
| Online form for services or benefits | 3 / 91 (3.3%) | 3 / 91 (3.3%) | 85 / 91 (93.4%) |
| Other online form | 0 / 91 (0%) | 0 / 91 (0%) | 91 / 91 (100%) |
| Other | 66 / 1263 (5.2%) | 61 / 1263 (4.8%) | 1136 / 1263 (89.9%) |

**Question 14**: If color is used to convey information, is the information also clear from the markup and/or text?

| Type of Web Page | Yes | No | Not Applicable |
|---|---|---|---|
| Description of activities | 611 / 1189 (51.4%) | 79 / 1189 (6.6%) | 499 / 1189 (42%) |
| Employment postings | 46 / 78 (59%) | 6 / 78 (7.7%) | 26 / 78 (33.3%) |
| Inherently graphical content (e.g., map or photograph) | 44 / 77 (57.1%) | 3 / 77 (3.9%) | 30 / 77 (39%) |
| Instructions for receipt of services or benefits | 130 / 221 (58.8%) | 4 / 221 (1.8%) | 87 / 221 (39.4%) |
| Online form for services or benefits | 42 / 91 (46.2%) | 20 / 91 (22%) | 29 / 91 (31.9%) |
| Other online form | 55 / 91 (60.4%) | 3 / 91 (3.3%) | 33 / 91 (36.3%) |
| Other | 637 / 1263 (50.4%) | 37 / 1263 (2.9%) | 589 / 1263 (46.6%) |

**Question 15**: Are foreground and background color combinations used that provide sufficient contrast when viewed by someone with color blindness or when viewed on a black and white screen?

| Type of Web Page | Yes | No | Not Applicable |
|---|---|---|---|
| Description of activities | 1051 / 1189 (88.4%) | 77 / 1189 (6.5%) | 61 / 1189 (5.1%) |
| Employment postings | 71 / 78 (91%) | 7 / 78 (9%) | 0 / 78 (0%) |
| Inherently graphical content (e.g., map or photograph) | 72 / 77 (93.5%) | 1 / 77 (1.3%) | 4 / 77 (5.2%) |
| Instructions for receipt of services or benefits | 215 / 221 (97.3%) | 6 / 221 (2.7%) | 0 / 221 (0%) |
| Online form for services or benefits | 65 / 91 (71.4%) | 22 / 91 (24.2%) | 4 / 91 (4.4%) |
| Other online form | 85 / 91 (93.4%) | 3 / 91 (3.3%) | 3 / 91 (3.3%) |
| Other | 1165 / 1263 (92.2%) | 43 / 1263 (3.4%) | 55 / 1263 (4.4%) |

**Question 16**: For auto-refreshing or timed response pages, is a second copy of the page provided where refresh only happens after a link has been selected (until user agents provide this ability themselves)?

| **Type of Web Page** | **Yes** | **No** | **Not Applicable** |
|---|---|---|---|
| Description of activities | 89 / 1189 (7.5%) | 55 / 1189 (4.6%) | 1045 / 1189 (87.9%) |
| Employment postings | 7 / 78 (9%) | 3 / 78 (3.8%) | 68 / 78 (87.2%) |
| Inherently graphical content (e.g., map or photograph) | 8 / 77 (10.4%) | 2 / 77 (2.6%) | 67 / 77 (87%) |
| Instructions for receipt of services or benefits | 38 / 221 (17.2%) | 5 / 221 (2.3%) | 178 / 221 (80.5%) |
| Online form for services or benefits | 12 / 91 (13.2%) | 3 / 91 (3.3%) | 76 / 91 (83.5%) |
| Other online form | 8 / 91 (8.8%) | 2 / 91 (2.2%) | 81 / 91 (89%) |
| Other | 95 / 1263 (7.5%) | 37 / 1263 (2.9%) | 1131 / 1263 (89.5%) |

**Question 17**: Is the Web page free from any blinking or updating of the screen that causes flicker?

| **Type of Web Page** | **Yes** | **No** | **Not Applicable** |
|---|---|---|---|
| Description of activities | 1033 / 1189 (86.9%) | 78 / 1189 (6.6%) | 78 / 1189 (6.6%) |
| Employment postings | 73 / 78 (93.6%) | 3 / 78 (3.8%) | 2 / 78 (2.6%) |
| Inherently graphical content (e.g., map or photograph) | 70 / 77 (90.9%) | 4 / 77 (5.2%) | 3 / 77 (3.9%) |
| Instructions for receipt of services or benefits | 175 / 221 (79.2%) | 6 / 221 (2.7%) | 40 / 221 (18.1%) |
| Online form for services or benefits | 82 / 91 (90.1%) | 4 / 91 (4.4%) | 5 / 91 (5.5%) |
| Other online form | 85 / 91 (93.4%) | 1 / 91 (1.1%) | 5 / 91 (5.5%) |
| Other | 1076 / 1263 (85.2%) | 54 / 1263 (4.3%) | 133 / 1263 (10.5%) |

**Question 18**: Is a fallback page provided for pages that contain frames?

| Type of Web Page | Yes | No | Not Applicable |
|---|---|---|---|
| Description of activities | 105 / 1189 (8.8%) | 152 / 1189 (12.8%) | 932 / 1189 (78.4%) |
| Employment postings | 5 / 78 (6.4%) | 9 / 78 (11.5%) | 64 / 78 (82.1%) |
| Inherently graphical content (e.g., map or photograph) | 20 / 77 (26%) | 3 / 77 (3.9%) | 54 / 77 (70.1%) |
| Instructions for receipt of services or benefits | 18 / 221 (8.1%) | 21 / 221 (9.5%) | 182 / 221 (82.4%) |
| Online form for services or benefits | 17 / 91 (18.7%) | 19 / 91 (20.9%) | 55 / 91 (60.4%) |
| Other online form | 8 / 91 (8.8%) | 4 / 91 (4.4%) | 79 / 91 (86.8%) |
| Other | 156 / 1263 (12.4%) | 100 / 1263 (7.9%) | 1007 / 1263 (79.7%) |

**Question 19**: For scripts that present critical information or functions, is an alternative, equivalent presentation or mechanism provided?

| Type of Web Page | Yes | No | Not Applicable |
|---|---|---|---|
| Description of activities | 174 / 1189 (14.6%) | 106 / 1189 (8.9%) | 909 / 1189 (76.5%) |
| Employment postings | 12 / 78 (15.4%) | 12 / 78 (15.4%) | 54 / 78 (69.2%) |
| Inherently graphical content (e.g., map or photograph) | 7 / 77 (9.1%) | 2 / 77 (2.6%) | 68 / 77 (88.3%) |
| Instructions for receipt of services or benefits | 60 / 221 (27.1%) | 24 / 221 (10.9%) | 137 / 221 (62%) |
| Online form for services or benefits | 8 / 91 (8.8%) | 7 / 91 (7.7%) | 76 / 91 (83.5%) |
| Other online form | 25 / 91 (27.5%) | 12 / 91 (13.2%) | 54 / 91 (59.3%) |
| Other | 179 / 1263 (14.2%) | 105 / 1263 (8.3%) | 979 / 1263 (77.5%) |

**Question 20**: For pages that use style sheets, are the contents of each page ordered and structured so that they read appropriately without the style sheet?

| **Type of Web Page** | **Yes** | **No** | **Not Applicable** |
|---|---|---|---|
| Description of activities | 137 / 1189 (11.5%) | 56 / 1189 (4.7%) | 996 / 1189 (83.8%) |
| Employment postings | 20 / 78 (25.6%) | 4 / 78 (5.1%) | 54 / 78 (69.2%) |
| Inherently graphical content (e.g., map or photograph) | 6 / 77 (7.8%) | 1 / 77 (1.3%) | 70 / 77 (90.9%) |
| Instructions for receipt of services or benefits | 47 / 221 (21.3%) | 1 / 221 (0.5%) | 173 / 221 (78.3%) |
| Online form for services or benefits | 10 / 91 (11%) | 20 / 91 (22%) | 61 / 91 (67%) |
| Other online form | 17 / 91 (18.7%) | 1 / 91 (1.1%) | 73 / 91 (80.2%) |
| Other | 191 / 1263 (15.1%) | 28 / 1263 (2.2%) | 1044 / 1263 (82.7%) |

**Question 21**: If frames are used, are titles provided so that users can keep track of frames by name?

| **Type of Web Page** | **Yes** | **No** | **Not Applicable** |
|---|---|---|---|
| Description of activities | 171 / 1189 (14.4%) | 113 / 1189 (9.5%) | 905 / 1189 (76.1%) |
| Employment postings | 9 / 78 (11.5%) | 8 / 78 (10.3%) | 61 / 78 (78.2%) |
| Inherently graphical content (e.g., map or photograph) | 19 / 77 (24.7%) | 1 / 77 (1.3%) | 57 / 77 (74%) |
| Instructions for receipt of services or benefits | 20 / 221 (9%) | 14 / 221 (6.3%) | 187 / 221 (84.6%) |
| Online form for services or benefits | 13 / 91 (14.3%) | 22 / 91 (24.2%) | 56 / 91 (61.5%) |
| Other online form | 7 / 91 (7.7%) | 4 / 91 (4.4%) | 80 / 91 (87.9%) |
| Other | 186 / 1263 (14.7%) | 60 / 1263 (4.8%) | 1017 / 1263 (80.5%) |

**Question 22**: Do you provide a "text only" alternative page to the original page?

| **Type of Web Page** | **Yes** | **No** | **Not Applicable** |
|---|---|---|---|
| Description of activities | 273 / 1189 (23%) | 674 / 1189 (56.7%) | 242 / 1189 (20.4%) |
| Employment postings | 13 / 78 (16.7%) | 49 / 78 (62.8%) | 16 / 78 (20.5%) |
| Inherently graphical content (e.g., map or photograph) | 30 / 77 (39%) | 42 / 77 (54.5%) | 5 / 77 (6.5%) |
| Instructions for receipt of services or benefits | 50 / 221 (22.6%) | 143 / 221 (64.7%) | 28 / 221 (12.7%) |
| Online form for services or benefits | 29 / 91 (31.9%) | 50 / 91 (54.9%) | 12 / 91 (13.2%) |
| Other online form | 14 / 91 (15.4%) | 61 / 91 (67%) | 16 / 91 (17.6%) |
| Other | 251 / 1263 (19.9%) | 700 / 1263 (55.4%) | 312 / 1263 (24.7%) |

**Question 23**: If you provide a "text only" alternative page, does it contain substantially the same information as the original page?

| **Type of Web Page** | **Yes** | **No** | **Not Applicable** |
|---|---|---|---|
| Description of activities | 294 / 1189 (24.7%) | 32 / 1189 (2.7%) | 863 / 1189 (72.6%) |
| Employment postings | 14 / 78 (17.9%) | 2 / 78 (2.6%) | 62 / 78 (79.5%) |
| Inherently graphical content (e.g., map or photograph) | 31 / 77 (40.3%) | 2 / 77 (2.6%) | 44 / 77 (57.1%) |
| Instructions for receipt of services or benefits | 44 / 221 (19.9%) | 8 / 221 (3.6%) | 169 / 221 (76.5%) |
| Online form for services or benefits | 29 / 91 (31.9%) | 1 / 91 (1.1%) | 61 / 91 (67%) |
| Other online form | 15 / 91 (16.5%) | 0 / 91 (0%) | 76 / 91 (83.5%) |
| Other | 266 / 1263 (21.1%) | 40 / 1263 (3.2%) | 957 / 1263 (75.8%) |

| **Question 24**: If your provide a "text only" alternative page, is it updated as often as the original page? | | | |
|---|---|---|---|
| **Type of Web Page** | **Yes** | **No** | **Not Applicable** |
| Description of activities | 288 / 1189 (24.2%) | 36 / 1189 (3%) | 865 / 1189 (72.8%) |
| Employment postings | 13 / 78 (16.7%) | 2 / 78 (2.6%) | 63 / 78 (80.8%) |
| Inherently graphical content (e.g., map or photograph) | 31 / 77 (40.3%) | 1 / 77 (1.3%) | 45 / 77 (58.4%) |
| Instructions for receipt of services or benefits | 45 / 221 (20.4%) | 6 / 221 (2.7%) | 170 / 221 (76.9%) |
| Online form for services or benefits | 29 / 91 (31.9%) | 1 / 91 (1.1%) | 61 / 91 (67%) |
| Other online form | 16 / 91 (17.6%) | 0 / 91 (0%) | 75 / 91 (82.4%) |
| Other | 255 / 1263 (20.2%) | 56 / 1263 (4.4%) | 952 / 1263 (75.4%) |

*Web Appendix C*[1]

## Question-by-Question to Responses to the Web Page Accessibility Checklist: Statistics by Agency Size

| **Question 1**: For all images, is alternative text provided? | | | | |
|---|---|---|---|---|
| **Type of Agency** | **Yes** | **No** | **Not Applicable** | **Total** |
| Overall (All Agencies) | 1849 (61.1%) | 881 (29.1%) | 298 (9.8%) | 3028 |
| Cabinet Level Agencies | 955 (56.6%) | 534 (31.7%) | 197 (11.7%) | 1686 |
| All Large Agencies | 217 (54.1%) | 154 (38.4%) | 30 (7.5%) | 401 |
| All Medium Agencies | 253 (75.7%) | 63 (18.9%) | 18 (5.4%) | 334 |
| All Small Agencies | 269 (72.7%) | 71 (19.2%) | 30 (8.1%) | 370 |
| All Very Small Agencies | 155 (65.4%) | 59 (24.9%) | 23 (9.7%) | 237 |

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[1] This document is available on the Department of Justice's section 508 Web site (www.usdoj.gov/crt/508). People with disabilities may request copies in Braille, large print, or on computer disk by calling 1-800-514-0301 (voice) or 1-800-514-0383 (TTY).

**Question 2**: For all applets, are alternative text and content provided?

| **Type of Agency** | **Yes** | **No** | **Not Applicable** | **Total** |
|---|---|---|---|---|
| Overall (All Agencies) | 364 (12%) | 228 (7.5%) | 2436 (80.4%) | 3028 |
| Cabinet Level Agencies | 208 (12.3%) | 141 (8.4%) | 1337 (79.3%) | 1686 |
| All Large Agencies | 43 (10.7%) | 43 (10.7%) | 315 (78.6%) | 401 |
| All Medium Agencies | 50 (15%) | 3 (0.9%) | 281 (84.1%) | 334 |
| All Small Agencies | 43 (11.6%) | 31 (8.4%) | 296 (80%) | 370 |
| All Very Small Agencies | 20 (8.4%) | 10 (4.2%) | 207 (87.3%) | 237 |

**Question 3**: For all image map links, is alternative text provided?

| **Type of Agency** | **Yes** | **No** | **Not Applicable** | **Total** |
|---|---|---|---|---|
| Overall (All Agencies) | 978 (32.3%) | 321 (10.6%) | 1729 (57.1%) | 3028 |
| Cabinet Level Agencies | 521 (30.9%) | 173 (10.3%) | 992 (58.8%) | 1686 |
| All Large Agencies | 140 (34.9%) | 73 (18.2%) | 188 (46.9%) | 401 |
| All Medium Agencies | 114 (34.1%) | 32 (9.6%) | 188 (56.3%) | 334 |
| All Small Agencies | 142 (38.4%) | 37 (10%) | 191 (51.6%) | 370 |
| All Very Small Agencies | 61 (25.7%) | 6 (2.5%) | 170 (71.7%) | 237 |

**Question 4**: If server-side image maps were used, are text links provided for each hotspot in the image map?

| Type of Agency | Yes | No | Not Applicable | Total |
|---|---|---|---|---|
| Overall (All Agencies) | 451 (14.9%) | 203 (6.7%) | 2374 (78.4%) | 3028 |
| Cabinet Level Agencies | 283 (16.8%) | 99 (5.9%) | 1304 (77.3%) | 1686 |
| All Large Agencies | 56 (14%) | 31 (7.7%) | 314 (78.3%) | 401 |
| All Medium Agencies | 53 (15.9%) | 44 (13.2%) | 237 (71%) | 334 |
| All Small Agencies | 44 (11.9%) | 22 (5.9%) | 304 (82.2%) | 370 |
| All Very Small Agencies | 15 (6.3%) | 7 (3%) | 215 (90.7%) | 237 |

**Question 5**: For all graphical buttons, is alternative text provided?

| Type of Agency | Yes | No | Not Applicable | Total |
|---|---|---|---|---|
| Overall (All Agencies) | 1825 (60.3%) | 352 (11.6%) | 851 (28.1%) | 3028 |
| Cabinet Level Agencies | 958 (56.8%) | 188 (11.2%) | 540 (32%) | 1686 |
| All Large Agencies | 270 (67.3%) | 50 (12.5%) | 81 (20.2%) | 401 |
| All Medium Agencies | 193 (57.8%) | 41 (12.3%) | 100 (29.9%) | 334 |
| All Small Agencies | 236 (63.8%) | 57 (15.4%) | 77 (20.8%) | 370 |
| All Very Small Agencies | 168 (70.9%) | 16 (6.8%) | 53 (22.4%) | 237 |

**Question 6**: Is there an absence of ASCII art, and, instead, are images and alternative text used?

| **Type of Agency** | **Yes** | **No** | **Not Applicable** | **Total** |
|---|---|---|---|---|
| Overall (All Agencies) | 1829 (60.4%) | 156 (5.2%) | 1043 (34.4%) | 3028 |
| Cabinet Level Agencies | 960 (56.9%) | 124 (7.4%) | 602 (35.7%) | 1686 |
| All Large Agencies | 282 (70.3%) | 8 (2%) | 111 (27.7%) | 401 |
| All Medium Agencies | 251 (75.1%) | 5 (1.5%) | 78 (23.4%) | 334 |
| All Small Agencies | 198 (53.5%) | 10 (2.7%) | 162 (43.8%) | 370 |
| All Very Small Agencies | 138 (58.2%) | 9 (3.8%) | 90 (38%) | 237 |

**Question 7**: If OBJECT was used to incorporate an image, applet, or script into a page, is the information also conveyed in an alternative means in cases where the OBJECT cannot be perceived, such as with "title" or within the body of the OBJECT element?

| **Type of Agency** | **Yes** | **No** | **Not Applicable** | **Total** |
|---|---|---|---|---|
| Overall (All Agencies) | 325 (10.7%) | 170 (5.6%) | 2533 (83.7%) | 3028 |
| Cabinet Level Agencies | 225 (13.3%) | 89 (5.3%) | 1372 (81.4%) | 1686 |
| All Large Agencies | 41 (10.2%) | 46 (11.5%) | 314 (78.3%) | 401 |
| All Medium Agencies | 32 (9.6%) | 8 (2.4%) | 294 (88%) | 334 |
| All Small Agencies | 2 (0.5%) | 20 (5.4%) | 348 (94.1%) | 370 |
| All Very Small Agencies | 25 (10.5%) | 7 (3%) | 205 (86.5%) | 237 |

| **Question 8**: Are long descriptions provided of all graphics that convey important information? | | | | |
|---|---|---|---|---|
| **Type of Agency** | **Yes** | **No** | **Not Applicable** | **Total** |
| Overall (All Agencies) | 412 (13.6%) | 777 (25.7%) | 1839 (60.7%) | 3028 |
| Cabinet Level Agencies | 238 (14.1%) | 409 (24.3%) | 1039 (61.6%) | 1686 |
| All Large Agencies | 85 (21.2%) | 99 (24.7%) | 217 (54.1%) | 401 |
| All Medium Agencies | 27 (8.1%) | 92 (27.5%) | 215 (64.4%) | 334 |
| All Small Agencies | 23 (6.2%) | 149 (40.3%) | 198 (53.5%) | 370 |
| All Very Small Agencies | 39 (16.5%) | 28 (11.8%) | 170 (71.7%) | 237 |

| **Question 9**: For stand-alone audio files, are textual transcripts of all words spoken or sun as well as all significant sounds provided? | | | | |
|---|---|---|---|---|
| **Type of Agency** | **Yes** | **No** | **Not Applicable** | **Total** |
| Overall (All Agencies) | 111 (3.7%) | 79 (2.6%) | 2838 (93.7%) | 3028 |
| Cabinet Level Agencies | 33 (2%) | 33 (2%) | 1620 (96.1%) | 1686 |
| All Large Agencies | 35 (8.7%) | 29 (7.2%) | 337 (84%) | 401 |
| All Medium Agencies | 22 (6.6%) | 7 (2.1%) | 305 (91.3%) | 334 |
| All Small Agencies | 20 (5.4%) | 2 (0.5%) | 348 (94.1%) | 370 |
| All Very Small Agencies | 1 (0.4%) | 8 (3.4%) | 228 (96.2%) | 237 |

**Question 10**: For audio associated with video, are captions — textual transcripts of dialog and sounds — synchronized with the video?

| **Type of Agency** | **Yes** | **No** | **Not Applicable** | **Total** |
|---|---|---|---|---|
| Overall (All Agencies) | 89 (2.9%) | 77 (2.5%) | 2862 (94.5%) | 3028 |
| Cabinet Level Agencies | 43 (2.6%) | 26 (1.5%) | 1617 (95.9%) | 1686 |
| All Large Agencies | 24 (6%) | 20 (5%) | 357 (89%) | 401 |
| All Medium Agencies | 2 (0.6%) | 23 (6.9%) | 309 (92.5%) | 334 |
| All Small Agencies | 20 (5.4%) | 1 (0.3%) | 349 (94.3%) | 370 |
| All Very Small Agencies | 0 (0%) | 7 (3%) | 230 (97%) | 237 |

**Question 11**: Where sounds are played automatically, are visual notification and transcripts provided?

| **Type of Agency** | **Yes** | **No** | **Not Applicable** | **Total** |
|---|---|---|---|---|
| Overall (All Agencies) | 60 (2%) | 73 (2.4%) | 2895 (95.6%) | 3028 |
| Cabinet Level Agencies | 35 (2.1%) | 32 (1.9%) | 1619 (96%) | 1686 |
| All Large Agencies | 23 (5.7%) | 26 (6.5%) | 352 (87.8%) | 401 |
| All Medium Agencies | 1 (0.3%) | 4 (1.2%) | 329 (98.5%) | 334 |
| All Small Agencies | 0 (0%) | 3 (0.8%) | 367 (99.2%) | 370 |
| All Very Small Agencies | 1 (0.4%) | 8 (3.4%) | 228 (96.2%) | 237 |

**Question 12**: For short animations such as animated "gifs" images, are alternative text and a long description provided, if needed?

| **Type of Agency** | **Yes** | **No** | **Not Applicable** | **Total** |
|---|---|---|---|---|
| Overall (All Agencies) | 320 (10.6%) | 155 (5.1%) | 2553 (84.3%) | 3028 |
| Cabinet Level Agencies | 142 (8.4%) | 85 (5%) | 1459 (86.5%) | 1686 |
| All Large Agencies | 87 (21.7%) | 46 (11.5%) | 268 (66.8%) | 401 |
| All Medium Agencies | 25 (7.5%) | 4 (1.2%) | 305 (91.3%) | 334 |
| All Small Agencies | 42 (11.4%) | 10 (2.7%) | 318 (85.9%) | 370 |
| All Very Small Agencies | 24 (10.1%) | 10 (4.2%) | 203 (85.7%) | 237 |

**Question 13**: For movies, are auditory descriptions provided and synchronized with the original audio?

| **Type of Agency** | **Yes** | **No** | **Not Applicable** | **Total** |
|---|---|---|---|---|
| Overall (All Agencies) | 105 (3.5%) | 102 (3.4%) | 2821 (93.2%) | 3028 |
| Cabinet Level Agencies | 58 (3.4%) | 65 (3.9%) | 1563 (92.7%) | 1686 |
| All Large Agencies | 25 (6.2%) | 22 (5.5%) | 354 (88.3%) | 401 |
| All Medium Agencies | 22 (6.6%) | 5 (1.5%) | 307 (91.9%) | 334 |
| All Small Agencies | 0 (0%) | 3 (0.8%) | 367 (99.2%) | 370 |
| All Very Small Agencies | 0 (0%) | 7 (3%) | 230 (97%) | 237 |

**Question 14**: If color is used to convey information, is the information also clear from the markup and/or text?

| **Type of Agency** | **Yes** | **No** | **Not Applicable** | **Total** |
|---|---|---|---|---|
| Overall (All Agencies) | 1576 (52%) | 153 (5.1%) | 1299 (42.9%) | 3028 |
| Cabinet Level Agencies | 1003 (59.5%) | 66 (3.9%) | 617 (36.6%) | 1686 |
| All Large Agencies | 173 (43.1%) | 34 (8.5%) | 194 (48.4%) | 401 |
| All Medium Agencies | 119 (35.6%) | 4 (1.2%) | 211 (63.2%) | 334 |
| All Small Agencies | 156 (42.2%) | 41 (11.1%) | 173 (46.8%) | 370 |
| All Very Small Agencies | 125 (52.7%) | 8 (3.4%) | 104 (43.9%) | 237 |

**Question 15**: Are foreground and background color combinations used that provide sufficient contrast when viewed by someone with color blindness or when viewed on a black and white screen?

| **Type of Agency** | **Yes** | **No** | **Not Applicable** | **Total** |
|---|---|---|---|---|
| Overall (All Agencies) | 2739 (90.5%) | 162 (5.4%) | 127 (4.2%) | 3028 |
| Cabinet Level Agencies | 1462 (86.7%) | 110 (6.5%) | 114 (6.8%) | 1686 |
| All Large Agencies | 374 (93.3%) | 15 (3.7%) | 12 (3%) | 401 |
| All Medium Agencies | 328 (98.2%) | 5 (1.5%) | 1 (0.3%) | 334 |
| All Small Agencies | 347 (93.8%) | 23 (6.2%) | 0 (0%) | 370 |
| All Very Small Agencies | 228 (96.2%) | 9 (3.8%) | 0 (0%) | 237 |

**Question 16**: For auto-refreshing or timed response pages, is a second copy of the page provided where refresh only happens after a link has been selected (until user agents provide this ability themselves)?

| Type of Agency | Yes | No | Not Applicable | Total |
|---|---|---|---|---|
| Overall (All Agencies) | 259 (8.6%) | 109 (3.6%) | 2660 (87.8%) | 3028 |
| Cabinet Level Agencies | 164 (9.7%) | 59 (3.5%) | 1463 (86.8%) | 1686 |
| All Large Agencies | 63 (15.7%) | 31 (7.7%) | 307 (76.6%) | 401 |
| All Medium Agencies | 27 (8.1%) | 8 (2.4%) | 299 (89.5%) | 334 |
| All Small Agencies | 3 (0.8%) | 5 (1.4%) | 362 (97.8%) | 370 |
| All Very Small Agencies | 2 (0.8%) | 6 (2.5%) | 229 (96.6%) | 237 |

**Question 17**: Is the Web page free from any blinking or updating of the screen that causes flicker?

| Type of Agency | Yes | No | Not Applicable | Total |
|---|---|---|---|---|
| Overall (All Agencies) | 2611 (86.2%) | 151 (5%) | 266 (8.8%) | 3028 |
| Cabinet Level Agencies | 1399 (83%) | 82 (4.9%) | 205 (12.2%) | 1686 |
| All Large Agencies | 342 (85.3%) | 48 (12%) | 11 (2.7%) | 401 |
| All Medium Agencies | 310 (92.8%) | 1 (0.3%) | 23 (6.9%) | 334 |
| All Small Agencies | 355 (95.9%) | 11 (3%) | 4 (1.1%) | 370 |
| All Very Small Agencies | 205 (86.5%) | 9 (3.8%) | 23 (9.7%) | 237 |

| **Question 18**: Is a fallback page provided for pages that contain frames? | | | | |
|---|---|---|---|---|
| **Type of Agency** | **Yes** | **No** | **Not Applicable** | **Total** |
| Overall (All Agencies) | 333 (11%) | 310 (10.2%) | 2385 (78.8%) | 3028 |
| Cabinet Level Agencies | 189 (11.2%) | 153 (9.1%) | 1344 (79.7%) | 1686 |
| All Large Agencies | 68 (17%) | 36 (9%) | 297 (74.1%) | 401 |
| All Medium Agencies | 14 (4.2%) | 10 (3%) | 310 (92.8%) | 334 |
| All Small Agencies | 42 (11.4%) | 49 (13.2%) | 279 (75.4%) | 370 |
| All Very Small Agencies | 20 (8.4%) | 62 (26.2%) | 155 (65.4%) | 237 |

| **Question 19**: For scripts that present critical information or functions, is an alternative, equivalent presentation or mechanism provided? | | | | |
|---|---|---|---|---|
| **Type of Agency** | **Yes** | **No** | **Not Applicable** | **Total** |
| Overall (All Agencies) | 469 (15.5%) | 271 (8.9%) | 2288 (75.6%) | 3028 |
| Cabinet Level Agencies | 248 (14.7%) | 137 (8.1%) | 1301 (77.2%) | 1686 |
| All Large Agencies | 60 (15%) | 42 (10.5%) | 299 (74.6%) | 401 |
| All Medium Agencies | 69 (20.7%) | 43 (12.9%) | 222 (66.5%) | 334 |
| All Small Agencies | 37 (10%) | 38 (10.3%) | 295 (79.7%) | 370 |
| All Very Small Agencies | 55 (23.2%) | 11 (4.6%) | 171 (72.2%) | 237 |

| **Question 20**: For pages that use style sheets, are the contents of each page ordered and structured so that they read appropriately without the style sheet? | | | | |
|---|---|---|---|---|
| **Type of Agency** | **Yes** | **No** | **Not Applicable** | **Total** |
| Overall (All Agencies) | 430 (14.2%) | 112 (3.7%) | 2486 (82.1%) | 3028 |
| Cabinet Level Agencies | 294 (17.4%) | 34 (2%) | 1358 (80.5%) | 1686 |
| All Large Agencies | 60 (15%) | 23 (5.7%) | 318 (79.3%) | 401 |
| All Medium Agencies | 48 (14.4%) | 1 (0.3%) | 285 (85.3%) | 334 |
| All Small Agencies | 10 (2.7%) | 27 (7.3%) | 333 (90%) | 370 |
| All Very Small Agencies | 18 (7.6%) | 27 (11.4%) | 192 (81%) | 237 |

| **Question 21:** If frames are used, are titles provided so that users can keep track of frames by name? | | | | |
|---|---|---|---|---|
| **Type of Agency** | **Yes** | **No** | **Not Applicable** | **Total** |
| Overall (All Agencies) | 430 (14.2%) | 224 (7.4%) | 2374 (78.4%) | 3028 |
| Cabinet Level Agencies | 245 (14.5%) | 101 (6%) | 1340 (79.5%) | 1686 |
| All Large Agencies | 68 (17%) | 31 (7.7%) | 302 (75.3%) | 401 |
| All Medium Agencies | 33 (9.9%) | 14 (4.2%) | 287 (85.9%) | 334 |
| All Small Agencies | 44 (11.9%) | 48 (13%) | 278 (75.1%) | 370 |
| All Very Small Agencies | 40 (16.9%) | 30 (12.7%) | 167 (70.5%) | 237 |

| **Question 22**: Do you provide a "text only" alternative page to the original page? | | | | |
|---|---|---|---|---|
| **Type of Agency** | **Yes** | **No** | **Not Applicable** | **Total** |
| Overall (All Agencies) | 661 (21.8%) | 1733 (57.2%) | 634 (20.9%) | 3028 |
| Cabinet Level Agencies | 334 (19.8%) | 959 (56.9%) | 393 (23.3%) | 1686 |
| All Large Agencies | 108 (26.9%) | 257 (64.1%) | 36 (9%) | 401 |
| All Medium Agencies | 94 (28.1%) | 157 (47%) | 83 (24.9%) | 334 |
| All Small Agencies | 64 (17.3%) | 246 (66.5%) | 60 (16.2%) | 370 |
| All Very Small Agencies | 61 (25.7%) | 114 (48.1%) | 62 (26.2%) | 237 |

| **Question 23**: if you provide a "text only" alternative page, does it contain substantially the same information as the original page? | | | | |
|---|---|---|---|---|
| **Type of Agency** | **Yes** | **No** | **Not Applicable** | **Total** |
| Overall (All Agencies) | 694 (22.9%) | 86 (2.8%) | 2248 (74.2%) | 3028 |
| Cabinet Level Agencies | 352 (20.9%) | 35 (2.1%) | 1299 (77%) | 1686 |
| All Large Agencies | 96 (23.9%) | 17 (4.2%) | 288 (71.8%) | 401 |
| All Medium Agencies | 92 (27.5%) | 6 (1.8%) | 236 (70.7%) | 334 |
| All Small Agencies | 82 (22.2%) | 20 (5.4%) | 268 (72.4%) | 370 |
| All Very Small Agencies | 72 (30.4%) | 8 (3.4%) | 157 (66.2%) | 237 |

**Question 24**: If you provide a "text only" alternative page, is it updated as often as the original page?

| Type of Agency | Yes | No | Not Applicable | Total |
|---|---|---|---|---|
| Overall (All Agencies) | 678 (22.4%) | 103 (3.4%) | 2247 (74.2%) | 3028 |
| Cabinet Level Agencies | 341 (20.2%) | 48 (2.8%) | 1297 (76.9%) | 1686 |
| All Large Agencies | 95 (23.7%) | 16 (4%) | 290 (72.3%) | 401 |
| All Medium Agencies | 88 (26.3%) | 11 (3.3%) | 235 (70.4%) | 334 |
| All Small Agencies | 82 (22.2%) | 20 (5.4%) | 268 (72.4%) | 370 |
| All Very Small Agencies | 72 (30.4%) | 8 (3.4%) | 157 (66.2%) | 237 |

# Software[1]

No type of information technology is more prevalent in the modern workplace than software. Software applications include word processors, spreadsheets, database management, groupware that enables colleagues to work in a networked environment, e-mail, Internet browsers, financial management and accounting programs, and others.

Almost all software applications contain some barriers to people with disabilities. Among the communities most likely to face significant barriers are those who are blind, those with low vision, and those with multiple disabilities. People who cannot use a computer mouse — including those with disabilities limiting manual dexterity or reach — can also find it difficult to use mainstream software applications, unless the applications allow users to use keyboard input or other means of interacting with the software.

## The Evaluation Tools

Federal components were asked to evaluate the accessibility of their 10 most commonly used software packages. The components were instructed to use the "Software Accessibility Checklist" developed by the Department of Justice for the objective portion of their survey. Agencies were also asked to evaluate these applications subjectively, by running them with assistive technologies commonly used by persons with disabilities such as screen readers.[2]

For each of the 10 software items evaluated, components were instructed to provide the following identifying and descriptive information:

- Title/Version
- Developer
- Customization
    - (a) commercial off-the-shelf software (used "as is")
    - (b) commercial software, but modified for agency use
    - (c) custom software, developed under contract
    - (d) custom software, developed in-house
- Description:
    - (a) word processor
    - (b) spreadsheet
    - (c) database
    - (d) groupware
    - (e) e-mail
    - (f) Internet browser
    - (g) other Internet access
    - (h) online database access
    - (i) other (describe)
- Weekly usage by members of the public and federal employees

Finally, agencies were also asked to prepare a comprehensive evaluation of electronic and information technology based on the evaluations completed by their components, any steps that the agency intended to take to improve accessibility, and recommendations for improving the accessibility of the Federal Government's software applications.

### I. *Objective Survey Tool: The "Software Accessibility Checklist"*

The Department of Justice's Software Accessibility Checklist was based on the U.S. Department of Education's *Requirements for Accessible Software Design* (Requirements), including the technical guidance that appears as *Appendix A* to the Requirements.[3] The Requirements document and the appendix are available at:

http://gcs.ed.gov/coninfo/clibrary/software.htm

To aid the reader, this section is broken down into 3 subparts:

- *Review of Survey Questions.* This section reviews the individual survey questions, providing both an explanation of the question and the results of the components' survey. For each question, we also provide background information that assisted us in developing the question and that may be used for further research by the interested reader.

- *Summary of Impact on Disability Categories*. This section summarizes, in a chart and accompanying text, how different disability categories are affected by the results of different survey questions.

- *Objective Survey of Accessibility by Disability Category*. This section builds on the prior two sections and summarizes the accessibility of federal agency software based on the survey answers provided by components.

### A. Review of Survey Questions

1. Does the software provide keyboard equivalents for all mouse actions, including buttons, scroll windows, text entry fields, and pop-up windows?

While providing a convenient "point and click" means of selecting options, a computer mouse also creates obstacles for persons with certain disabilities if "keyboard equivalents" are not provided. In general, persons affected by software requiring mouse input include several categories of disabilities:

- Blind users are unable to meaningfully use a mouse because visual information is essential for understanding the importance of different regions on a computer screen.

- Other low vision users may not posses the ability to see the mouse pointer effectively and may also be excluded by software that requires mouse input.

- Some users with physical disabilities who lack the dexterity or range of motion necessary to effectively use a mouse may also be excluded.

While each of these groups may be excluded by software requiring mouse action, they may be able to use the software if "keyboard equivalents" for all mouse actions are provided. The simplest example of such a "keyboard equivalent" is the use of combination keystrokes to replace mouse action. For instance, instead of requiring the user to select the "File" menu item and then select "print" to print a document, a program should allow the user to simply hit the keystroke combination of "Control-P."

2. Does the program provide clear and precise instructions for use of all keyboard functions as part of the user documentation?

The responses by the federal components suggest that most software packages include keyboard equivalents for all mouse actions. See Table 1.[4] Components provided a "no" response for 221 of the 1,676 software reviews (13%).[5]

Users who require keyboard functions to use software need clear and precise instructions for using these keyboard functions. Unfortunately, user manuals and documentation (help files, instructions, etc.) often neglect the importance of these keyboard equivalents, focusing instead on mouse or pointer actions.

Therefore, users in any of the categories of disabilities described in the analysis accompanying Question 1 will also require clear and precise instructions for use of all keyboard functions as part of the user documentation. In addition, users with cognitive impairments or learning disabilities will require clear instructions for keyboard access in the user documentation since not all software programs use the same keystrokes for actions. Therefore, having clear instructions for keyboard actions for all users will help people with cognitive impairments and learning disabilities use multiple software packages with minimal error.

A response of "not applicable" to this question indicates either that user documentation does not exist, that keyboard functions are not provided, or that the agency misinterpreted this question. A response of "no" indicates that user documentation does not include clear and precise instructions for all keyboard functions. In either case, these responses indicate a potential barrier to access.

Twenty-six percent (428 of 1,676) of the software surveys indicated that the application does not provide clear and precise instructions for keyboard functions. See Table 2. This relatively high rate represents a substantial barrier to the efficient use of existing software applications by persons with disabilities – but one that can be relatively easily corrected. All components that identified such lapses in their software documentation should contact the manufacturers and urge them to provide full instructions, preferably in an electronic format that can be posted to agency or private sector Web sites.

3. Are instructions regarding keyboard use widely available for all users in your component?

Even when instructions for keyboard functions are clearly and precisely written in the user documentation, users with specific disabilities may be excluded if these instructions are not widely available to all users in a component. Persons with disabilities, who may already be partially excluded from full interaction with other employees based on other technological barriers or difficulty in communicating, may have even less reason to know about instructions for keyboard use unless all users in a component have access to this information.[6]

Like Question 2, a response of either "no" or "not applicable" indicates a potential barrier to access by persons with disabilities. In almost 30% (496 of 1,676) of the software surveys, components indicated that the applications do not have keyboard instructions that are widely available to all users. See Table 3. This situation, too, represents a significant problem for people with disabilities. Addressing it should be assigned a high priority.

4. Does the software have a logical tabbing order among fields, text boxes, and focal points?

A "logical tabbing order" is a technique which all different user choices or options can be accessed by repeatedly hitting a particular key (typically the "tab" key) or combination of keys. For instance, if the software package includes icons at the top of the screen depicting user choices (e.g., "open file", "print", "save", etc.), repeatedly hitting the "tab" key may allow different options to become highlighted. Once highlighted, the user can select that option by hitting the "enter" key. The tabbing order has to be "logical" in the sense that it should scroll through all of the choices consecutively and in the same order each time. This technique is important because it ensures that the software can be used in the same way by all users.

A logical tabbing order among fields, text boxes and focal points is as crucial to the same groups of users as identified in Questions 2 and 3. Blind users may be unable to use a mouse and will require a logical keyboard tabbing order to ensure information clarity and ease of use. Users with low vision may not possess the ability to see the mouse pointer effectively, thus making a logical tabbing order necessary for information clarity and ease of use. Some people with physical disabilities may also be affected by the absence of a logical tabbing order. Finally, persons with cognitive impairments and learning disabilities may require a consistent tabbing order to assist with training and learning.

As almost all software requires user input and provides selection of user options, a "not applicable" answer does not make sense.[7] Therefore, an answer of either "no" or "not applicable" indicates problems with accessibility. In 14% (232 of 1,676) of the software surveys, components indicated that the applications do not provide a logical tabbing order among fields, text boxes, and focal points. See Table 4.

5. When navigating screens and dialog boxes using the keyboard, does the focus follow a logical tabbing order?

The screen of a typical computer program usually provides several user options. Frequently, one of the options is highlighted and can be accessed by hitting the "enter" key. The item which is selected and which can be invoked by hitting the enter key is the point of "focus." This "focus" usually changes depending on the screen that is currently before the user. For instance, if the user tries to save her work in a file that already exists, the program may generate a "dialog box" that asks whether the user wants to overwrite the existing file with a new one. The dialog box may include two buttons ("yes" and "no") and the "no" button may have a bold dark line around its perimeter. In that case, the "no" button is the "focus" and selecting "enter" will indicate that the user does not wish to overwrite her other file. However, the user can change the focus by using the "tab" key or other key combination. For instance, if the user hits the tab key, the bold dark line may disappear from the "no" button and switch to the "yes" button. In that case, the "yes" button has become the focus. Using the tab key in this example permits the focus to follow a logical tabbing order.

As the focus is critical to providing a keyboard alternative to the use of a mouse, the same groups of users identified in Question 4 may also be affected by this situation. In 14% (233 of 1,676) of the software surveys, components indicated that the applications do not ensure that the focus follows a logical tabbing order when the user navigated screens and dialog boxes using the keyboard. See Table 5.

6. Is there a well-defined focal point that moves with keyboard navigation (e.g., can you use the arrow keys to navigate through a list followed by pressing the ENTER key or space bar to select the desired item)?

As described in the analysis accompanying Question 5, a "focus" is that portion of the visual display which is a "default" user choice of input. A focus can be changed through software that permits a logical tabbing order among elements of the screen. However, that focal point must be well-defined (e.g., identifiable by a bold outline, highlighting, etc.) and must be moveable with keyboard navigation – otherwise, a mouse click would still be necessary to make selections other than the one that is currently highlighted. A well-defined focus is important because screen readers can easily follow and properly read the well-defined focus.

The same groups of users identified in Questions 4 and 5 are affected by this situation according to responses in Question 6. In 18% (300 of 1,676) of the software surveys, components chose a "no" or "not applicable" response to this question, indicating that there is no well-defined focal point that moves with keyboard navigation. See Table 6.

7. Are shortcut keys provided for all pull-down menus?

Many modern software packages use a mouse for "point and click" access to functions that may otherwise be hard for a user to remember. "Pull-down menus" are a further simplification in software design that allows designers to organize related functions under a common heading. When a user clicks on the heading for a pull-down menu, a box drops down with a listing of several options that are all related to the heading. For instance, many software packages have a "file" and "edit" menu that includes commands that are very commonly used. The "edit" menu may contain, for instance, "copy", "cut", and "paste" commands that can be easily accessed by the user. If a user wants to "cut" text from a paragraph, he simply selects the text with his mouse, clicks on "edit" and then chooses "cut." He can then move that text to another portion of his document by simply selecting a location with his mouse, then again clicking "edit" and then "paste."

Unfortunately, using pull-down menus places heavy reliance on the mouse to "point and click" to gain access to functions hidden away under pull-down menus. If the software requires the use of a mouse, then users who cannot use a mouse may be excluded from accessing functions that other users could obtain by simply clicking on a menu heading.

One alternative to requiring the use of a mouse is to provide a "shortcut key" for the functions organized by the pull-down menus. In programs operating in the Microsoft Windows family of operating systems, simultaneously pressing the "control" key and the letter "x" will "cut" a selection, while "control" and "V" will "paste" that same selection. For very commonly used functions (like cutting and pasting), shortcut keys provide an accessible, convenient and fast way to use common functions. However, providing a shortcut key to *all* functions is impractical because many computer programs have a large number of rarely used functions and users are unlikely to remember all of the shortcut keys.

Another alternative to the mouse is by providing a "shortcut key" to the pull-down menu itself. In most Microsoft Windows programs, hitting the "alt" key followed by a letter (usually underlined in the heading of the menu) will pull down a particular menu. Then, a user can move the focus to an item on the menu (usually by using the "up" and "down" cursor buttons) and select that function by hitting the enter key. While not quite as "speedy" as a shortcut key to a specific function, this method is ultimately more versatile because it permits access to all functions of a program in exactly the same way that a mouse provides "point and click" access to important functions based on the menu to which the functions are logically related.

The groups of users in this situation have similar experience as those identified in Questions 4, 5, and 6. In 37% (618 of 1,676) of the software surveys, components chose a "no" or "not applicable" response to this question, indicating that shortcut keys are not provided for all pull-down menus. See Table 7.

8. Does the software support existing accessibility features built into the operating system (e.g., sticky keys, slow keys, repeat keys in Apple Macintosh OS or Microsoft Windows 95)?

An operating system is a computer "program" that creates an environment within which other programs operate. At the most rudimentary level, it defines certain sets of instructions that are used by other programs and which allow these programs to use the resources made available by the computer hardware. More advanced operating systems can also make certain resources (e.g., printers and other computers on a network) universally available to all programs operating on a computer. Desktop operating systems include Microsoft Windows 3.1, 95, 98, or NT, UNIX, LINUX, and Apple Macintosh, among others.

Several operating systems, such as Microsoft Windows and Apple Macintosh, can alter the way computers function to accommodate persons with disabilities. For instance, some operating systems can be told to ignore brief or repeated keystrokes. By activating special settings in an operating system, a person lacking fine motor control or having tremors can use a keyboard with fewer errors. Other operating systems allow users to change the screen colors to use high-contrast colors or low contrast color combinations (as needed), to select personalized color combinations, or to significantly magnify portions of the screen. These settings allow some users with low vision to be able to better read the screen. Blind users who are unable to use a mouse may require the ability to use "mouse keys," which allow the use of the keyboard cursor keys to make mouse movements. Other accessibility options in some operating systems allow people with hearing disabilities to utilize functions that provide visual cues associated with audio warnings or displays. Users with any combinations of these disabilities will be also affected by a software package's inability to inherit accessibility features of an operating system. Finally, users with cognitive impairments and learning disabilities may benefit from accessibility options built into many operating systems.

As useful as these accessibility features in an operating system may be, software running on that operating system may interfere with these features. If software interferes with these accessibility features, then a user with disabilities may again be excluded from using computer software. Since not all operating systems incorporate accessibility features, a "not applicable" response may be expected, while a "no" response indicates a problem with accessibility. In 14% (236 of 1,676) of the software surveys, components indicated that the applications interfere with accessibility features of the operating systems on which they run. See Table 8.

9. If timed responses are present, does the software allow the user to modify the timing parameters of any required timed responses?

Certain software packages require a timed response from the user. If a program encounters an error performing a task requested by the user, it may present a small window with information about the problems encountered with an "okay" button for the user to click to acknowledge the problem and continue, or a "cancel" button for the user to click if he wants to abort processing. However, in most circumstances, the program may include a timed response. If the user doesn't hit either the "okay" or the "cancel" button within 30 seconds, the program will continue processing as if the user had chosen the "okay" button.

Other computer programs use timed responses for varied purposes. One instance: to discourage unauthorized use of a computer, a computer program can automatically lock out a user after a timed period if no input is provided for two minutes. Another instance: screen savers, which can automatically turn on within a fixed period of inactivity, either to preserve the integrity of the computer monitor or to prevent energy loss.

While there are many legitimate reasons for software to require a timed response from users, these timed responses also have the potential for excluding users who, because of their disabilities, may not be able to respond within the time period required. For instance, blind users or users who have low vision may require additional time to become aware of, or familiar with, a dialog box or screen requesting a timed response. Users with certain physical disabilities may also need additional time to respond. Finally, users with learning, language, or cognitive impairments and learning disabilities may need more time to become aware of and familiar with the response requested.

As many or most computer programs do not require a timed response from a user, an answer of "not applicable" does not necessarily imply a problem with accessibility. By contrast, a "no" response does suggest a problem with accessibility. In 11% (185 of 1,676) of the software surveys, components indicated that the software application potentially creates barriers to access through the use of timed responses that cannot be modified by the user. See Table 9.

10. Are all descriptions or labels for fields positioned immediately to the left or directly above the control, and do they end in a colon, so that it is easy for screen reading software to associate the labels with the corresponding fields?

Screen reading software allows users with disabilities affecting vision to access information on a computer screen by converting text into a different format, such a speech output or refreshable Braille. While a screen reader "reads" the information on a screen, it traverses the screen from left to right and from top to bottom, following the basic course a sighted user's eyes move when reading the contents on a page.

Yet, when the screen reader "reads" the contents of a screen, descriptions and labels for fields may be easily confused with the contents of those fields unless the descriptions and labels are clearly and uniformly marked and placed above or to the left of their corresponding fields.

In 24% (402 of 1,676) of the software surveys, components reported that the software application does not associate the contents with description and field labels where they can be readily understood by users using screen readers. See Table 10.

11. Does every window, object, and control have a clearly named label?

Different operating systems, particularly modern graphic user interface (GUI) systems, can provide a large number of simultaneous screen elements. At any one time, a computer screen can be displaying a word processing program in one window, a spreadsheet in another window, and an e-mail system in a third window. To further complicate this array of information, each window can have different objects, tool bars, dialog boxes, and controls-- each of which affects the user's ability to use a program.

As confusing as the modern computer screen may be for a nondisabled person, it may be difficult or impossible for a user with a disability to access each window, object, and control unless it is clearly labeled. Without such a label, screen reading software cannot tell the user with which window, object, or control he or she is confronted — thereby making the information presented hopelessly confusing for those who rely on that technology. Such information must be clearly linked with its associated information— either by its proximity to related information or by creating an association that can be recognized by screen reading software. Clearly named labels also greatly assists those who use screen enlargement software and those with cognitive impairments and learning disabilities.

In 8% (139 of 1,676) of the software surveys, components reported that the software does not incorporate clearly named labels for every window, object, and control. See Table 11.

12. Does the software application use standard controls rather than owner-drawn or custom controls?

Default software controls for common functions and dialog boxes are often provided by the operating system supporting the program. When a user decides that she would like to print a document, the dialog box that appears is usually created by the operating system. These default controls are usually readable by screen readers and thus provide some level of accessibility for users of screen reading software, because they permit the screen reader to identify the title and desired action of each control. Furthermore, users of screen enlargement software also benefit from using standard controls, because familiar functions can be easily found.

By contrast, owner-drawn or custom controls may be quite different from the standard controls available to that particular software package. Such non-standard controls will likely not permit the screen reader to identify the type, name, or action required of each control. Users of screen enlargement software may also find it much more difficult to locate controls and identify actions required by that control if the control is different from the standard control.

Therefore, non-standard controls may tend to exclude persons who are blind or persons with low vision. In 15% (249 of 1,676) of the software surveys, components chose a "no" or "not applicable" response to this question. See Table 12.

13. Does the software have a user selectable option to display text on icons, i.e., text only icons or bubble help?

With the increasing popularity of software based on a so-called "graphic user interface" system (GUI), the use of icons is wide-spread. An icon is a pictorial representation of a function or action performed by the program; icons are typically used to represent the most commonly used functions. For instance, an icon of an open folder may represent "open a document," an icon of a computer disk may mean "save the file to disk," and an icon of a computer printer may mean "print this document." While convenient for nondisabled users, however, these icons are not independently accessible to screen readers because there is no text associated with the icon. Although a person may be able to discern the image of a printer in an icon, a computer screen reader cannot. Therefore, icons without associated text present a barrier to users who are blind. Also, users with low vision may not have sufficient visual acuity to discern the image represented by the icon. Finally, while some users with cognitive impairments and learning disabilities may prefer the use of icons for popular functions, others may require text to convey the function or action.

Although icons are not independently accessible to users with disabilities affecting vision or cognitive impairments and learning disabilities, combining these icons with text can make them accessible. For instance, if the user can select to have "text only" icons (i.e., short words to represent popular functions or actions) or can select to have "bubble help" (i.e., textual description of actions when the mouse or point of focus is moved over the icon), then all of these users may be able to use the icons presented by the program. Blind people will be able to use them because a screen reader will be able to detect the text that is associated with the icon. Similarly, users with low vision who cannot discern the image of a printer, for example, may be able to read the words, "print this document." Finally, users with cognitive impairments and learning disabilities who may be confused by an image will have associated text to either read or have audibly translated.

If a computer program does not use icons, the program will generally be accessible to persons with disabilities. Therefore, a response of "not applicable" has no bearing on the accessibility of the software program. In 18% (296 of 1,676) of the software surveys, components indicated that the software does not provide user-selectable text labels for icons. See Table 13.

14. Is the use of icons consistent throughout the application?

To use any computer program, it is very important for all users that the location of all functions be consistent and available at all times. It is crucial that icons representing basic functions (e.g., "open a file," "save a document," and "print a document") be routinely located in the same place.

For users with disabilities, this need is even greater because they have much more difficulty using software, if the location or image of an icon representing a particular function is changed from one program to another. Also, screen readers rely heavily on consistency to identify controls and icons. Low vision users also need consistency for identifying and differentiating icons. Finally, learning computer programs becomes dramatically more difficult for all users if different icons for the same function are used in different portions of the application, especially for users with cognitive impairments or learning disabilities.

If a computer program does not use icons, "not applicable" is a neutral answer, not reflecting negatively on the program's accessibility. Five percent (76 of 1,676) of the software surveys gave a "no" response to this question. See Table 14.

15. Are menus with text equivalents provided for all icon functions or icon selections on menu, tool, and format bars?

To make their programs as easy to use as possible, most manufacturers of computer software using icons try to carefully place their icons in the most convenient place possible. Software designers typically place these icons along one or more "bars," where the user can always look for important, commonly used, and related functions or actions. Sometimes, these bars are "detachable" allowing the user to position them anywhere on the screen. In most computer programs, they are positioned (by default) at the top of the screen.

The functions associated with the icons in the menu, tool, and format bars are typically the most important and commonly used functions. Software designers are very careful to ensure that only the most important functions take up valuable space on these bars because they are critical for ease of use for most users. In fact, many software programs allow users to select their own icons for these important locations.

If a function or action is important enough to justify a position on a menu, tool, or format bar, it is important to ensure that it is accessible to users with disabilities. Many users who are blind, have low vision, have certain physical disabilities, or have certain cognitive impairments or learning disabilities may not be able to use a mouse and may require keyboard equivalents (see analysis accompanying Questions 1-7). Keyboard access can be provided through menus with text equivalents for all of these important icons.

If a printer icon is located on the tool bar of a program, a menu equivalent of that icon that can be accessed through the keyboard may be as follows:

- "alt" key, followed by letter "f" (accesses the "File" menu)
- letter "p" (activates "print" function on that menu)
- "enter" (confirms print selection)

In 9% (149 of 1,676) of the software surveys, components gave a "no" response to this question. See Table 15.

16. If there are audio alerts, are visual cues also provided?

Many software programs incorporate audio alerts typically to indicate when a user has tried to perform an action that cannot be legally performed. For instance, if a user is editing a portion of a document and tries to print the document while editing the document, hitting the shortcut key associated with printing (e.g., "control" and "p") may generate a chirping audio alert indicating that the user has tried to perform an illegal action.

If an audio alert is not accompanied by some other visual cue, users who are deaf or hard of hearing may not be aware of the cue. In addition, some users with learning disabilities may have difficulty responding properly or efficiently to audio cues that are not accompanied by visual cues.

"Not applicable" is a neutral answer to this question and does not reflect negatively on the program's accessibility (for instance, when a computer program does not have any audio alerts). In 10% (167 of 1,676) of the software surveys, components chose "no," indicating that the software does not provide visual alerts for all audio alerts. See Table 16.

17. Does the software support the "show sounds" feature where it is built into the operating system?

"Show Sounds" is a feature provided by some operating systems, such as Microsoft Windows 95 and 98. For programs that support "Show Sounds," a visual representation is created for the sound. For instance, a screen may "blink" to notify the user of incoming e-mail.

The same group of users identified in Question 16 are also affected by the lack of availability of this special feature. Again, a response of "not applicable" may not be indicative of a problem, because the "Show Sounds" feature may not be built into the operating system. Eighteen percent (305 of 1,676) of the software surveys gave a "no" response to this question, indicating a problem with accessibility. See Table 17.

18. Can the user disable or adjust sound volume?

Sound volume affects different groups of users in different ways. Users who are hard-of-hearing may need to increase the sound volume to meet their needs. Some users with cognitive impairments or learning disabilities may need to turn up the volume to provide clarity for comprehension, while other users may find it distracting and need to disable or lower the sound volume.

In 10% (175 of 1,676) of the software surveys, components gave a "no" response to this question, indicating a problem with accessibility. See Table 18.

19. If information is provided in an audio format, is it also capable of being displayed by the user in a visual format?

Information can be conveyed to a user in a number of different ways. Most commonly, computer information is provided in visual format through the computer screen. Occasionally, however, information can also be conveyed through audio. When information is presented through audio, however, there is the potential for excluding certain groups of users.

This question, like Questions 16-18, relates to the usability of software by users who are deaf or hard of hearing or who need alternatives because they cannot comprehend audio formats. If a user is unable to hear audio, a text format should be provided. If a person is unable to process information audibly, an alternative format such as text can be used.

In 15% (225 of 1,676) of the software surveys, components gave a "no" response to this question, indicating a problem with accessibility. See Table 19.

20. Is the software application free of patterned backgrounds used behind text or important graphics?

Patterned backgrounds may be used behind text to create unusual or special effects, but they may present difficulties for several groups of users. Such backgrounds may present problems for users with low vision, who require clarity and contrast of the text and important graphics. Users with lack of color perception may also be affected because text or icons may disappear against a patterned background. Additionally, users with learning disabilities or cognitive impairments may be affected because their comprehension of important material may be clouded.

Since a "not applicable" response is not appropriate for this question, such a response may indicate a problem with accessibility. In 16% (265 of 1,676) of the software surveys, components indicated that the software is inaccessible in this respect. See Table 20.

21. Can a user override default fonts for printing and text displays?

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Users with low vision may require enlarged display of text on computer screens to use their computers, where an enlarged display may make it easier to discern characters. This same concern applies to printed text.

Therefore, users with low vision may require that the software permits them to override default fonts for printing and text displays. This feature would allow them to choose a font size that is larger and easier to read.

Again, choosing "not applicable" is inappropriate. Accordingly, a response of either "no" or "not applicable" may indicate a problem with accessibility. Twenty-eight percent (472 of 1,676) of the software surveys gave responses of "no" or "not applicable" to this question. See Table 21.

22. Can a user adjust or disable flashing, rotating, or moving displays?

In addition to being potentially annoying to all users, flashing, rotating, or moving displays can cause seizures in people with visually-induced seizure disorders. Thus, this group of users may find it crucial to disable such displays or adjust them.

As many software packages intentionally do *not* include flashing, rotating, or moving elements, a response of "not applicable" may be appropriate without suggesting a problem with accessibility. Fourteen percent (240 of 1,676) of the software surveys gave a "no" response to this question, indicating a potential problem for people with visually-induced seizure disorders. See Table 22.

23. Does the software ensure that color-coding is never used as the only means of conveying information or indicating an action?

Information can be conveyed to a user in a variety of different ways. Most commonly, software will include buttons or menu choices for different functions. For instance, the buttons associated with printing a document can convey information with words (e.g., "print") or graphics (e.g., a picture of a computer printer). Other questions in this survey have addressed the accessibility problems associated with using graphic images (without associated text) for conveying information. A related question, however, is whether the software uses color as the only way of conveying information. The software may provide only a red and green square and then instruct the user to hit the green button to print a document or the red button to cancel.

Conveying information or indicating actions in this way— solely through color-coding— has obvious impact on users with disabilities affecting their perception of colors. Other groups of users with disabilities limiting vision are also affected. Users with low vision may be unable to distinguish colors. Furthermore, since screen reader software cannot distinguish colors, blind users and many users with low vision cannot use some functions of the software.

While many computer systems (particularly terminal systems and older systems) are monochromatic, software intended for such systems cannot use color. In this case, a component may respond "not applicable" without indicating an accessibility problem. In 13% (220 of 1,676) of the software surveys, components gave a "no" response to this question. See Table 23.

24. Does the application support user-defined color settings system-wide?

Some programs and operating systems allow users to change the color settings of their computers. If a user needs high-contrast colors (e.g., black on white), the user can select these options and have these choices carry over throughout the application or all programs using that operating system. On the other hand, other users may find high-contrast color choices difficult to view and may require "softer" color choices. Because different disability groups may require different color settings, it is important for software applications to support *user-defined* color settings that are respected system-wide.

Users with lack of color perception are affected by the ability of an application to support user-defined color settings. In addition, users with low vision may also need high-contrast or low-contrast color settings and are also affected by an application's ability to meet this requirement.

Because some computer systems do not have color settings because they use monochromatic displays; a response of "not applicable" does not necessarily reflect negatively on the software's accessibility. In 18% (294 of 1,676) of the software surveys, components gave a "no" response to this question. See Table 24.

25. Is highlighting also viewable with inverted colors?

As with user-definable color settings (Question 24), the ability to view text formatted in different ways is important to users with low vision and users with lack of color perception. This condition is particularly true with "highlighted" text, which is commonly displayed using different colors for the actual letters of the text (e.g., red letters) or the background immediately surrounding the text (e.g., highlighted portions in black letters on a yellow background). Both of these display options may cause problems for these users. Instead, a better option is to allow highlighted text to be viewable with inverted colors, so it is easily viewable by most users with lack of color perception or users with low vision who are able to discern text.

As some (albeit few) programs may not highlight text, a "not applicable" response does not reflect negatively on accessibility. The results show that 16% (260 of 1,676) of the software surveys indicated that the software does not allow highlighting to be displayed in inverted colors. See Table 25.

26. If the software application draws its own screen elements, does it pick up the size settings that the user has selected in the Control Panel?

As explained in the analysis accompanying Question 8, the operating system for computers can include accessibility features that are inherited by programs running on that operating system. One feature of operating systems such as the Microsoft Windows family of operating systems (Microsoft Windows 3.1, 95, 98, and NT) is the "control panel" that permits the user to set features (including accessibility features) for that operating system.

Among the settings that can be set in the control panel are size settings for fonts and graphics. This feature greatly enhances accessibility for users with low vision. If a software program creates its own screen elements, however, there is a possibility that these size settings will not be followed by that program, thereby potentially excluding the low vision user.

A "no" response may indicate a problem with accessibility. Fifteen percent (247 of 1,676) of the software surveys gave a "no" response to this question. See Table 26.

27. Are all manuals and documentation provided in electronic format as well as ASCII text files, including text descriptions of any charts, graphs, pictures, or graphics of any nature?

All users of software applications should be provided with adequate documentation including help files, user manuals, and instructions. Generally, users without disabilities may be able to use a printed manual to answer their questions about using a program. A printed manual, however, would not be effective for those who are blind (who may need Braille or speech output) or people with low vision (who may need large print).

To meet the diverse needs of these different groups of users, manuals and documentation should be provided in an electronic format. In particular, ASCII text is probably the simplest type of computer file that reduces all textual information into a form that can be "read" by almost any computer program. Textual descriptions of all graphic or pictorial information is also critical because screen reading software cannot discern and convey information depicted graphically. Another option for providing accessible text is HTML.

A "not applicable" response may be appropriate without affecting accessibility, as where a computer program has no manuals or documentation in any format. Thirty-seven percent (612 of 1,676) of the software surveys gave a "no" response to this question. See Table 27.

28. Can a user choose to have any report generated by the software made available in a "print to ASCII file" format?

Many programs can generate printed reports. Spreadsheet programs and word processors can all print out a paper copy of their documents. While useful, these printed copies may not meet the needs of all users. In particular, users who are blind or who have low vision may not be able to use a printed copy. As explained in the analysis accompanying Question 27, an electronic file may be the only way to meet the diverse accessibility needs of all users.

One way that a printout can be rendered in an electronic format is to have the computer program "print to disk". This process will make the computer program save an electronic copy of the printed material in an electronic format. Most commonly, this electronic format is plain ASCII text because this is a near-universal file format that can be read by almost any computer program. Another option for providing accessible text is HTML.

As some software may not generate printed reports (i.e., some data entry software), a "not applicable" answer may be appropriate without indicating the level of accessibility of a software package. According to the results, 26% (430 of 1,676) of the software surveys gave a "no" response to this question. See Table 28.

29. Is special training provided for users with disabilities that will enable them to become familiar with the software and learn how to use it in conjunction with assistive technology provided as an accommodation?

Specialized training, often provided one-on-one, may be necessary to enable users with disabilities to become familiar with software and with how to use the software in conjunction with assistive technology. Classroom-based computer training is inappropriate for blind users because they must pay attention to both the screen reader and the instructor speaking. In this example, the instructor must also be familiar with the needs of blind learners and the access tools they use. Therefore, training should be tailored to the individual's needs for all disabilities.

All disability categories are affected by whether training for using a computer program meets the needs of their disability. Given the importance of training— particularly training in conjunction with assistive technology— a response of "not applicable" is inappropriate because special training may be required for users with disabilities, even if training is not otherwise provided for other users. Fifty-three percent (882 of 1,676) of the software surveys showed that specialized training is not provided for users with disabilities.[8] See Table 29.

## B. Summary of Impact on Disability Categories

The following chart summarizes the survey questions and the disability categories that are affected by responses to those questions.

| | Questions | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 |
| Hard of Hearing | | | | | | | | X | | | | | | | | X | X | X | X | | | | | | | | | | X |
| Deafness | | | | | | | | X | | | | | | | | X | X | | X | | | | | | | | | | X |
| Disabilities Affecting Hearing and Vision | X | X | X | X | X | X | X | X | X | | X | | X | X | X | | | | | X | X | | X | X | X | X | X | X | X |
| Blindness | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | | | | | | | | X | | | | X | X | X |
| Color Blindness | | | | | | | | | | | | | | | | | | | | X | | | X | X | X | | | | X |
| Low Vision | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | | | | | X | X | | X | X | X | X | X | X | X |
| Tremor or Limited Strength or Dexterity | X | X | X | X | X | X | X | X | X | | | | | | X | | | | | | | | | | | | | | X |
| Cognitive Impairments or Learning Disabilities | | X | X | X | X | X | X | X | X | | X | | X | X | X | X | X | X | X | X | | | | | | | | | X |
| Seizure Disorders | | | | | | | | | | | | | | | | | | | | | | X | | | | | | | |

## C. Objective Survey of Accessibility by Disability Category

The chart provides a general summary of the effect that survey responses to different questions will have on various groups of users with disabilities. Within each "category" of users with disabilities, different subgroups may find particular features more important than others. Also, the nature of the software package may affect the type of features that different users find important for accessability. Finally, accessibility and "ease of use" are largely individual and may vary with user preferences or experience with different types of user interfaces. Nevertheless, the following analysis provides an overview of how various categories of users with different disabilities are affected by software used by the federal agencies.

### 1. Users Who are Hard of Hearing

Questions 8, 16, 17, 18, 19, and 29 affect users who are hard of hearing. Each of these questions addresses features that may make software more accessible to specific individuals with disabilities affecting hearing, but no particular feature can make software packages accessible to all users who are hard of hearing. For instance, some users may require visual cues because their disabilities are sufficiently severe as to make any audio cues unusable (Question 16). By contrast, others who are moderately hard of hearing may simply require adjustable sound volume (Question 17).

Fewer than 2% (28 of 1,676) of the software packages completely excludes users who have disabilities affecting hearing because they do not provide any accessibility features that meet their needs. At the same time, however, over two-thirds (68%) (1,137 of 1,676) of the surveys indicated that the software packages do not meet at least one of these six questions, clarifying that some users who are hard of hearing may encounter barriers to access using these products. See Table 30.

### 2. Users Who are Deaf

Questions 8, 16, 17, 19, and 29 affect users who are deaf. Deaf users encounter many of the same problems with software as other users who have disabilities affecting hearing; the five questions addressing access by deaf users also affect accessibility for those who are hard of hearing. Of the six questions raising issues affecting users with other disabilities affecting hearing, only Question 18 (user adjustable sound volume) is irrelevant for deaf users. No particular question or subset of these five questions can accurately assess the accessibility of a software package to individual users.

In only 2% (34 of 1,676) of the software surveys, components indicated that the applications are inaccessible in all of these respects. However, in 66% (1,113 of 1,676) of the software surveys, components included at least one response to one of these five questions that indicated a problem with accessibility. See Table 31.

### 3. Users with Disabilities Affecting Hearing and Vision

A large number of questions affect usability by users with some combination of disabilities affecting both hearing and vision. Specifically, a total of 22 questions (Questions 1-9, 11, 13-15, 20-21, and 23-29) all affect accessibility by this group of users. This group includes users with disabilities affecting vision (low vision, blindness, or lack of color perception) and hearing (partial hearing loss or deafness). The three possible forms of disabilities affecting vision and two forms of disabilities affecting hearing considered in this survey lead to six possible categories of disabilities:

- low vision and deaf
- low vision and partial hearing loss
- lack of color perception and deaf
- lack of color perception and partial hearing loss
- blind and deaf
- blind and partial hearing loss

The following chart summarizes those questions that affect each of these six groups of users.

| Disability Category | Questions Affecting Accessibility |
|---|---|
| low vision & deaf | 1-9, 11, 13-15, 20-21, 23-29 |
| low vision & partial hearing loss | 1-9, 11, 13-15, 20-21, 23-29 |
| lack of color perception & deaf | 20, 23-25, 29 |
| lack of color perception & partial hearing loss | 20, 23-25, 29 |
| blind & deaf | 1-9, 11, 13-15, 23, 27-29 |
| blind & partial hearing loss | 1-9, 11, 13-15, 27-29 |

Twenty-two questions affect users with low vision (both deaf and with partial hearing loss). In less than 1% (13 of 1,676) of the software surveys, software applications indicated problems in all of these questions. However, 84% (1,413 of 1,676) of the surveys showed that components gave at least one response suggesting a problem with accessibility for this group of users with respect to software applications. See Table 32.

As noted in the chart, users with lack of color perception (both deaf and partial hearing loss) are affected by the smallest subset of the 22 questions. Less than 2% (27 of 1,676 ) of the software surveys showed that software applications were inaccessible in all of these relevant respects. However, in 67% (1,125 of 1,676) of the surveys, components included at least one response suggesting that the software posed a problem with accessibility for this group of users. See Table 33.

The chart also indicates that blind users who are also deaf are affected by 17 of the 22 questions affecting users with various combinations of disabilities affecting hearing and vision. Less than 1% (13 of 1,676) of the software surveys signified that the software under review included problems in all of these questions. In 92.5% (1,550 of 1,67) of the surveys, however, components included at least one response suggesting a problem with accessibility for this group of users. See Table 34.

Finally, the chart indicates that blind users with partial hearing loss are affected by 16 of the 22 questions. In less than 1% (13 of 1,676) of the software surveys, the software showed problems in all of these questions. Moreover, 92% (1,548 of 1,676) of the surveys, components, however, included at least one response suggesting a problem with accessibility for this group of users. See Table 35.

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### 4. Users Who Are Blind

Nineteen questions (Questions 1-15, 23, 27-29) affect users who are blind. In almost 1% (13 of 1,676) of the software surveys, components indicated that the software did not provide accessibility with respect to all of these questions. In 93% (1,552 of 1,676) of the surveys, however, components included at least one response suggesting a problem with accessibility for blind users. See Table 36.

### 5. Users Who Have Difficulties Discerning or Using Colors

To meet all of the needs of this group of users, the five questions (Questions 20, 23-25, and 29) must be correctly answered. In only 2% (27 of 1676) of the software surveys, components included a negative response to all of these questions. In 67% (1125 of 1676) of these surveys, however, agencies included a negative response to at least one of these questions. See Table 37. These figures include Questions 20 (patterned backgrounds) and Question 29 (training).

Only three questions directly target accessibility for users who have difficulty discerning or using colors. Questions 23, 24, and 25 specifically target these groups. Close to 4% (66 of 1,676) of the software surveys showed that software posed barriers to persons having difficulty discerning or distinguishing colors. In 30% (494 of 1,676) of the surveys, components indicated that the software included one or more of these barriers to access for persons having difficulty discerning or distinguishing colors. See Table 38.

### 6. Users Who Have Low Vision

As noted in the chart, over 80% of the questions in the software accessibility survey may affect usability by those with low vision. Specifically, responses to Questions 1-15, 20-21, and 23-29 all affect usability of the software by this group of users. In less than 1% (13 of 1,676) of the software surveys, components gave responses suggesting barriers to access with respect to all of these questions. By contrast, in over 93% (1,560 of 1,676) of the surveys, components indicated that the software contained at least one potential barrier to access by persons with low vision. See Table 39.

Unfortunately, because of the large number of questions involved and the different ways that users with low vision can be affected by software accessibility, the importance of the information provided by Table 39 is somewhat limited. A review of the 19 questions that comprise this section, however, reveals some patterns that affect different groups of users with low vision. Any of these questions may independently prevent a specific user from being able to meaningfully use the software, thereby making a "ranking" of importance impossible. Instead, different groups of users with low vision may be able to use software in different ways. Since users with disabilities affecting vision are so significantly affected by software accessibility, the following section analyzes accessibility for this diverse group of users based on the likely means that different types of users will use software.

Not surprisingly, many of the problems confronting users who are blind also affect users with low vision. The chart reflects this overlap; specifically, of the 24 questions affecting users with low vision, 19 affect users who are blind. This overlap is understandable because, like blind users, many users with low vision may require screen reading software and a large number of questions relate to the usability of software with screen reading software. The survey questions affecting users with low vision requiring screen reading software are therefore summarized in the section addressing usability by blind users.

However, not all users with low vision are served by screen reading software. Instead, they may benefit from screen enlargement technologies. Questions 20-21 and 24-26 affect users who have low vision, but not users who are blind. Of the questions affecting blind users, Questions 8-9, 14, 23, and 29 also affect users with low vision who do not require the use of screen reading software. In 1% (18 of 1,676) of the software surveys, components indicated that the software posed barriers in all of these areas. In 91% (1,524 of 1,676) of the surveys, components indicated that the application posed one or more barriers to access to this group of users. See Table 40.

### 7. Users Who Have Tremor or Limited Reach, Strength, or Dexterity

Users with tremors or limited reach, strength, or dexterity will be affected according to the respons-

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es to 11 questions (Questions 1-9, 15, and 29). These questions focus on keyboard equivalents for mouse actions, but also address special accessibility features of the operating system and training materials and documentation.

A little over 1% (24 of 1,676) of the software surveys indicated that software posed potential barriers in all 11 areas. In 92% (1,535 of 1,676) of the surveys, components indicated one or more problems with accessibility for this group of users. See Table 41.

### 8. Users Who Have Cognitive Impairments or Learning Disabilities

Users who have cognitive impairments or learning disabilities are affected by issues raised in 18 of the questions. Specifically, Questions 2-9, 11, 13-20, and 29 all affect users with cognitive impairments and learning disabilities. Since accommodating users with cognitive impairments and learning disabilities cannot be addressed in broad generalities and may require individual assessment of the user's abilities, a further refinement of these questions to target specific subgroups is difficult.

In less than 1% (15 of 1,676) of the software surveys, components indicated that the software had barriers in all of these areas. By contrast, 93% (1,552 of 1,676) of the surveys found one or more barriers to access for this group of users. See Table 42.

### 9. Users Who Have Visually-Induced Seizure Disorders

Question 22 focuses on users with visually-induced seizure disorders. In 14% (240 of 1,676) of the software surveys, components indicated possible accessibility problems for this group of users. See Table 43.

## II. *Subjective Software Analysis*

Apart from objectively evaluating their software, components were also asked to subjectively evaluate each software package that they were reviewing. In addition, components were also asked to provide an overall comprehensive evaluation of their electronic and information technology, and a discussion of any plans or recommendations for improving accessibility of electronic and information technology. Each of these sections are analyzed separately below.

### A. Question 30 of the Software Accessibility Checklist

While evaluating each component's 10 most popular software packages for usability by persons with disabilities and compatibility with assistive technologies commonly used by people with disabilities, components were also instructed to perform a subjective evaluation of their software using an assortment of assistive technologies:

> 30. After you have evaluated this application using the Checklist, test it by running the application with a sampling of the common assistive technologies used by persons with disabilities (including, at a minimum, screen readers, and, if possible, alternate input devices, screen enlargement software, and voice recognition software and devices). Describe the accessibility successes and problems you encountered during these testing exercises, as well as your plans for addressing any problems.

This subjective format evaluation tool was necessary because not all accessibility issues could be addressed adequately in an objective checklist-style evaluation. Additionally, the "hands on" experience of actually working with assistive technology greatly enhances the evaluators' awareness of accessibility barriers.

Many of the components' responses clearly indicate the need for greater understanding of assistive technology. Information technology officials who do not have a basic understanding of and access to assistive technology (such as screen reading software, Braille output displays, etc.) are unlikely to be prepared to meet their components' obligations to provide reasonable accommodations to qualified persons with disabilities under sections 501 and 504 of the Rehabilitation Act. If the federal agencies' equal employment opportunity (EEO) officers – who traditionally work on reasonable accommodation issues – are not consulted with respect to the selection and deployment of mainstream information technology, then employees and members of the public with disabilities are likely to experience undue delays in fulfilling (or, where the underlying software cannot be made compatible with assistive technology, denials of) their requests for reasonable accommodations. Not paying attention to accessibility can result in higher costs, decreased productivity, and a loss of valuable, skilled personnel.

***A Promising Practice: The Department of Education's Voluntary Technical Assistance to Other Agencies***

In the Software Accessibility Checklist and the accompanying Resource Guide, agencies were urged to contact the Department of Education for assistance:

> More specific recommendations for how to design accessible software can be obtained from Joe Tozzi or others on the Assistive Technology Team in the Department of Education's Office of the Chief Information Officer Technology Center, (202) 708-7298 (voice), (202) 401-8510 (TTY), Internet: Joe_Tozzi@ed.gov.

Software Accessibility Checklist, page 1. The Department of Education followed up on every request for assistance, essentially becoming a cost-free, full-service technical assistance office for other agencies during and after the self-evaluation process. Not only did the Department of Education assist other agencies in conducting their evaluations, it hosted representatives from numerous agencies visiting its Assistive Technology Demonstration Center to see first-hand how screen readers, voice recognition technology, computer mouse alternatives, TTY-enabled computers, and other types of assistive technology can be seamlessly integrated into an agency's full-service technology program.

Despite the clear instructions given in Question 30, and the availability of assistance from the Department of Education and other agencies,[9] relatively few components tested their software applications for compatibility and usability with assistive technologies such as screen readers. Of the 1,676 software surveys completed by components, relatively few included a clear evaluation of the software package using assistive technology. Some responses to Question 30 were too vague to determine whether testing had been done. Half of the surveys indicated that no testing had been attempted; these were usually accompanied by a statement that the agency had no assistive technology with which to conduct the evaluations. Of those software applications that were tested, approximately 240 of the evaluations reflected a careful analysis of the accessibility strengths and weaknesses of the software applications, as revealed by testing them with assistive technologies.

Many components indicated that they did not have assistive technology available to test their software. The Department of Justice neither required nor expected agencies to purchase new assistive technology merely to facilitate their section 508 self-evaluations. Nevertheless, too many components stated that assistive technology was unavailable because it was only provided on an ad hoc basis, or because the component simply employed no people with disabilities. Some components indicated that they planned to perform testing in the near future. Others indicated that they would continue to rely on statements made by the software developer. Still others expressed confusion regarding the nature of assistive technology and noted that they could not find features such as "screen readers" in their existing software packages.

***Example: Loss of Valuable Human Resources***

One federal employee reported the following:

"Two programmers at a midwestern [agency] installation can no longer do their programming as the [agency] has adopted [an internally developed] programming system using the powerbuilding tools. Powerbuilder is an object-based programming tool not accessible to speech or Braille output. These two employees, I understand, were excellent programmers. The supervisor called [the agency's assistive technology program] asking for [it] to find powerbuilding training for these employees. He understood that the employees could not benefit from a mouse-based training class;

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however, his disappointment grew when [the assistive technology program officials] advised him that powerbuilder is an inaccessible tool due to its graphic orientation. He was frustrated as he said he cannot afford to lose his programmers when [the assistive technology officials] advised him that these employees would need to be retrained for jobs at the same responsibility level."

As already noted, components carefully evaluated 240 software applications using assistive technology.[10] Of these, half reportedly worked well with the assistive technologies with which they were tested. Seventy-five of the remaining 115 software packages had minor problems. Thirteen of these 75 were due to be replaced soon with more accessible products. Forty software packages that were tested had severe accessibility problems, 10 of which were due to be replaced soon with more accessible software.

Some barriers that were discovered stemmed from representations of graphic or tabular information, that posed problems when run with screen readers. Other software applications did not work at all with screen readers and other assistive technologies.

Due to the relatively small number of software applications tested, it is difficult to draw firm conclusions. The data suggest, though, that a potentially significant percentage of software used by components poses barriers for persons who use assistive technologies. The lack of precision with which these results were reported makes it difficult to discern clear patterns among the types of software applications that were problematic. Often, instead of writing tailored responses to Question 30 for each software application, agencies included a summary discussion in their overall agency evaluations. If the components had been more precise, it would have been easier to tell whether, as one would expect, spreadsheets presented greater difficulties for persons who use assistive technologies than, for instance, word processing software.

In 51 of the evaluations, components indicated that they did not perform testing but relied on the experiences of current users of assistive technologies. Generally, these users reported only minor difficulties. Lack of training and the inaccessibility of the assistive technology were the most common complaints. Users with disabilities were often unable to receive adequate training because training materials were not provided in alternate formats and trainers were unfamiliar with assistive technologies and how their use would affect the mainstream application. Better education about accessibility features for users and information technology specialists is part of the solution. Software manufacturers and developers can help people with disabilities by highlighting accessibility features in their products, either by providing accessibility user manuals or building accessibility help files into their products.

Another excellent recommendation provided by one component was to empower end-users by conducting "training needs surveys" for all users within an agency, including those who use assistive technologies. Too often, users are not aware of or may be reluctant to ask for special training for accessibility features in software. If components conduct regular surveys of all their employees' training needs, they may expect greater productivity from their employees and greater awareness among all employees of software accessibility features and their importance for users with disabilities. Certainly, given the low response rate of the components to Question 29, such awareness among information technology specialists may go a long way towards making software more accessible for all users.

Some users with disabilities did report problems working with some types of software. Some of these barriers can be overcome by adequate training to nondisabled personnel who should understand how to use the software to minimize barriers for their co-workers.

***One federal employee's experience: use of color in word processing***

"I am blind and multiply disabled. One problem I have recently run into at [my agency] is that when I am on a committee wordsmithing documents, my JAWS for Windows screen-reader

> program cannot search for text by color. When members are making proposed changes, one person will pick blue, one purple, one red, etc."

Until screen readers can recognize colors or scripts are written to assign labels to colors, federal employees who are working collaboratively with persons who are blind or color blind should routinely use a second means of identifying each person's contributions, such as inserting his or her initials before a change.

### B. Overall Agency Reports: Discussion of Software

Thirty-nine overall agency reports included specific findings and recommendations for software accessibility. Two positive changes were noted simply through conducting the survey. First, 14 of the components specifically reported that they found their software generally accessible and most promised to consult the software developers about the problems identified during their survey. Second, many agencies also agreed to consider accessibility an important feature for future software development and procurement.

The overall survey, however, revealed two potential problems among the federal agencies. First, 15 of the 39 components relied on policies of providing accommodations on an ad hoc basis for their software users. Although it is vitally important that agencies provide reasonable accommodations for their employees, section 508 requires accessibility of electronic and information technology regardless of whether individual requests are made. As a practical matter, providing accommodations on an ad hoc basis also does not meet the needs of individuals with disabilities for several important reasons. First, as noted by many components, many individuals within an agency are unaware of what equipment or training opportunities are available to them. Second, because some software is intrinsically inaccessible or difficult to use with assistive technology, an agency may never be able to provide reasonable accommodations for such software. For instance, if a component's database of shared files is maintained and accessed through software that does not include keyboard equivalents for all mouse "point and click" commands to accommodate an employee who cannot use a mouse, the component would have to provide an assistant to help the employee with a disability use the shared files. On the other hand, if the component were to purchase and use accessible software, then the employee with a disability could independently access the database of shared files and would have the opportunity to perform on a level playing field with his or her peers.

A small number of components reported that "hands on" testing of software using assistive technology was impossible because such equipment was unavailable or because agency personnel were unfamiliar with such equipment. During the Department's survey, components were not expected to purchase software or equipment simply to complete the survey. However, the fact that many of them could not test their software using assistive technology also reveals that the information technology infrastructure is indicative that such agencies may have great difficulty in providing such aids to software users with disabilities on a timely basis.

The agency reports also revealed that federal agencies used primarily commercial off-the-shelf (COTS) software. The Federal Acquisition Regulation (FAR) requires covered agencies to "acquire commercial items or nondevelopmental items when they are available to meet the needs of the agency." FAR, pt. 12, sec. 12.1(b).

### C. Recommended Solutions

Agencies provided a wealth of recommendations and possible solutions for improving the accessibility of software used by the federal agencies. Also, in evaluating the agencies' responses, the Department identified special noteworthy solutions and "promising practices" adopted by particular agencies. All agencies should look to these solutions as a practical means for addressing accessibility needs within their agencies.

The first set of solutions recommended or implemented by various agencies affect the policies or procedures of those agencies. Many have created committees of employees with disabilities to help ensure that the agencies' information technology is accessible to persons with disabilities. For larger agencies, this strategy may be effective for ensuring the participation of users with disabilities.

Most agencies recognize their longstanding obligations for providing reasonable accommodations to employees with disabilities under sections 501 and 504 of the Rehabilitation Act. When an employee with a disability requests an accommodation, many agencies have a stated policy of providing reasonable accommodations, including training opportunities, on an ad hoc basis. In conducting their section 508 surveys, many agencies have noticed that employees with disabilities often do not take full advantage of accommodations and training opportunities to assist them. This lack of participation may be due to a lack of understanding by all employees of opportunities available within their agencies for receiving accommodations that may help them perform their jobs. Several agencies have made excellent recommendations for addressing these problems. Some of them have developed a "needs survey" for all employees. In addition to educating employees about accommodations and training opportunities within an agency, disseminating such a survey may help make an agency more "disability friendly" by raising awareness of disability issues among all employees and managers. Recognizing this need, one very large agency has developed a Web page on the agency's intranet to distribute information to its employees and to collect requests for accommodations and training. Because of the geographic diversity of this agency and the relative autonomy of its components, using an intranet Web site appears to be an excellent approach.

Employees may more effectively request needed training and accommodations if they are aware that such opportunities exist. Agencies can help their employees become more productive by making information about these resources available to everyone and by streamlining the process for requesting such assistance. We highly recommend that all large agencies consider these approaches in providing assistive technology and training for their employees.

Some agencies, such as the Department of Education, have created software testing centers for all software used within their agency, and we commend them for their commitment and leadership in helping achieve the goals of section 508. However, not all agencies have resources available for such testing centers.

### *A Promising Practice: National Endowment for the Arts Considers 'Mobile Alternate Access Stations'*

The National Endowment for the Arts (NEA) is considering developing a number of "mobile alternate access computer stations" that would incorporate accessibility features using assistive technologies. The NEA would place these stations in its library, where members of the public with disabilities would be able to use them. In addition to helping meet the needs of visitors to the agency, these mobile alternate access stations could be quickly relocated to employees' offices as persons with disabilities are hired by NEA. The stations would also serve as testing labs for the agency to determine whether new software applications were compatible with assistive technologies used by the agency.

Several agencies expressed a strong interest in the development of clear guidelines and training for procurement officers and information technology specialists regarding accessible software design. Other agencies believed that participation in inter-agency initiatives, such as the Universal Access Working Group (UAWG), was important to making their agencies more accessible.

Agency resources and knowledge should be shared between the agencies. Inter-agency initiatives, such as the UAWG, are an important step for fostering the participation of all agencies in a collective efforts of making federal agencies' information technology more accessible. However, what agencies need most is very specific guidance in their procurement decisions. For instance, if a very small agency using standard operating system software is considering several COTS office suites, it may not make sense for it to spend its resources testing that software when thorough tests have already been performed by other agencies using the same operating system. To facilitate the collection of this very specific information, several agencies recommended the development of an inter-agency testing center. Such a center could provide testing facilities for software products and could act as a central repository of information about accessibility issues involving different software packages. It may also help information technology specialists at different agencies "network" to share experiences with different software packages.

Several agencies also recommended greater involvement of the private sector in helping make software packages more accessible. These agencies recognized that, while much of their software was once custom developed software, the vast majority of their current software is COTS software produced by very large software companies.[11]

Other agencies expressed frustration that there is not enough sharing of information among agencies.

One final recommendation is based on agencies' objective responses. As indicated in analysis of Question 29 of the Software Accessibility Checklist, between one-third and one-half of all software surveys indicated that specialized training was unavailable for employees with disabilities.[12] As training is particularly important for users with disabilities, specialized training should be a paramount concern for all agencies.

### *A Promising Practice: Social Security Administration's ADAPT Technology*

"Recently, we accepted the challenge of finding an innovative solution to deliver course material that meets everyone's needs, including those with severe vision loss.

"Traditionally, our course material has been developed using a column format that is user friendly for those not having a visual impairment. A column format with headings in the left column leaves more white space that is more pleasing to the eye and allows a person to scan the left column quickly for headings they are looking for. In addition, we use different font attributes and styles such as bold, shadow, italic, etc. that draws the attention of the reader. This same format creates problems for visually impaired employees. Many of our visually impaired employees use screen reader technology to have the computer speak what is on the screen to them. In most instances the screen reader cannot interpret column formats so it reads the text as if it was being displayed in single column format. What the visually impaired employee hears is garbled information. Also, many of the font styles and attributes used to highlight information for a non-visually impaired employee can be difficult for someone with low vision to read, particularly when it is magnified.

"We pursued several different options [for making our courses accessible to those with visual impairments]. First, we tried to convert our course material to ASCII text. This eliminated much of the special formatting, but we found it was also deleting sections of course material. Next, due to limited in-house resources, we hired a contractor to convert one of our courses. This cost SSA $23,000 and it took almost three months to have the work completed [for one course] . . . .

"We knew we had to find an innovative solution for [our remaining courses]. That solution was ADAPT (A Document Accessibility Program for the office of Training). ADAPT is a software program we created that automates the process of converting our training course material into an accessible format for our visually impaired employees. ADAPT reformats text that is developed in column format to linear text. It also strips out tables, eliminates special font effects such as shadow, emboss, sets margins, and changes numerous other formatting issues that impact accessibility. ADAPT also analyzes course material documents to determine if our course material standards are being followed. If ADAPT finds formatting that does not follow the standards, a document is created noting any inconsistencies so course material authors can make any necessary corrections.

"The same course that cost us $23,000 and took approximately 3 months to complete can be converted to an accessible format in less than 4 hours using ADAPT."

### D. Recommendations

The Department recommends the following:

1. Training Needs Surveys. Each agency should develop and distribute "training needs" surveys to all employees. These surveys should explicitly address training needs for people with disabilities, especially those who use assistive technology in conjunction with mainstream software applications. EEOC should provide guidance to agencies on this issue.

2. Appropriate, Periodic Training. Each agency should train all IT personnel, procurement officials, "help desks" and other support personnel, and users with disabilities, regarding basic accessibility issues. To conserve resources, GSA and the Access Board, in consultation with other key agencies and inter-agency groups, should create training modules that can be shared among agencies. GSA and the Access Board should also make available lists of appropriate training vendors. Each agency should ensure that specialized training is available for users with disabilities for all software packages for which training is generally provided, including training provided by third-parties on behalf of agencies.

3. Software Compatibility Testing Centers. As agencies update and centralize their IT architecture, they should create software compatibility testing centers at which software can be evaluated for compatibility with existing agency platforms and with commonly used assistive technologies. Larger agencies may wish to establish their own compatibility testing centers. An inter-agency software compatibility testing center should be established to assist smaller agencies, larger agencies without testing centers, and private software manufacturers and developers. Centers at Department of Defense, Department of Education, the Social Security Administration, Department of Veterans' Affairs, and GSA can serve as models.

4. Documentation (Instructions, Help Files, User Manuals, Etc.). Many software applications have accessibility features of which most users, trainers, 'help desk' personnel, and others are unaware. Other software applications (such as word processors, Adobe Acrobat, etc.) can be used to create information products. Knowledgeable users can use these applications to create information products that are relatively accessible. Other people may inadvertently use the same applications in such a way that the information products they create are largely inaccessible. Each agency should require its software vendors to include clear documentation of the accessibility features and appropriate uses of their products to maximize accessibility.

5. "COTS Software Accessibility Manuals". Because many of the Federal Government's current software applications may continue to be used for a long time, federal agencies must make the most of the accessibility features built into currently-used software, rather than rely exclusively on procurement of new accessible software. GSA and the Access Board, in consultation with other key agencies and inter-agency groups, should consult with software manufacturers and should develop and distribute supplemental manuals for users of commercial off-the-shelf (COTS) software applications. These manuals should include clear instructions for maximizing the accessibility of COTS applications currently used by federal agencies and for promoting accessibility and minimizing barriers in the information products some COTS applications (such as Adobe Acrobat) are used to produce. Specific information, such as macros developed to provide shortcut keys where none previously existed, should be incorporated into these manuals.

6. Government-Wide, Low-Cost Programming Solutions. GSA and the Access Board, in consultation with other key agencies and inter-agency groups, should contact manufacturers of COTS software to determine whether software updates, containing programming "fixes" of barriers identified in this Report, can be purchased for a low fee and distributed throughout all federal agencies. Each agency that has already developed programming solutions to remove barriers to COTS applications should be encouraged to continue this work and to share their results with all appropriate agencies.

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[1] This document is available on the Department of Justice's section 508 Web site (www.usdoj.gov/crt/508). People with disabilities may request copies in Braille, large print, or on computer disk by calling 1-800-514-0301 (voice) or 1-800-514-0383 (TTY).

[2] A "screen reader" is a software application that makes text available to people who are blind, who have low vision, or who have cognitive impairments or learning disabilities that affect their ability to read. Screen readers read in an artificial voice text that appears on a computer screen. Most screen readers use a variety of voices; they may change from a male voice to a female voice, for instance, to indicate an Internet link or highlighting. Screen readers can also be used in conjunction with refreshable Braille displays. Refreshable Braille displays are units that are equipped with pins that move up and down to form the "dots" of Braille characters. As the user reads along, he or she can advance the Braille characters to the next line (or go back, if desired).

[3] The Department of Education (DOE) has led the Federal Government in promoting accessibility for persons with disabilities in software design. Its work has benefitted not only its own agency, but also many state and local governments and private organizations interested in making software accessible to all computer users. To this end, the DOE has assembled an Assistive Technology Team in the DOE's Office of the Chief Information Officer Technology Center. This office continues to test new software, assist manufacturers and agencies to understand accessibility issues in software design, and refine their own standards for accessible design.

[4] Accompanying this analysis are 4 sets of appendices, which include tables and descriptions of the data provided by the agencies. These Software Appendices can be summarized as follows:

- *Software Appendix A* includes the tables specifically mentioned in the text of this Report.

- *Software Appendix B* includes a summary of all responses to each question by the agencies, arranged according to the type of agency (e.g., cabinet level, large, medium, small, and very small).

- *Software Appendix C* includes a summary of all responses by the agencies, arranged according to the type of software reviewed (e.g., word processor, spreadsheet, database, etc.).

- *Software Appendix D* includes a summary of all responses by the agencies, arranged according to the software's level of customization (e.g., commercial "off-the-shelf", modified, etc.).

[5] The percentages throughout the discussion of software are raw data, not weighted values. That is, they do not reflect any overlap that would exist when multiple components evaluated the same software application, nor do they reflect the number of people who use a particular application. The Department did not receive reliable usage statistics on which to perform the necessary calculations.

[6] As a practical matter, developers should include "keyboard shortcuts" in their Microsoft Windows help system for their application, where appropriate.

[7] On each of the "Checklists," the Department structured the objective-format questions such that the answer indicating a product was more accessible was almost always "yes," while the answer indication that a product likely contained barriers was usually "no." Each page of the Checklists accordingly stated, "Any 'no' answer may indicate a problem with accessibility." Some evaluators may have selected "not applicable" as a response, even when doing so was inappropriate, to avoid choosing the "inaccessible" answer.

[8] Some components, however, may have included a "not applicable" response because they did not have any employees with disabilities using the software package evaluated. Given the importance of training for all users (particularly users with disabilities) and the fact that training needs for users with disabilities should be considered whenever any training program is developed (regardless of whether there are currently users with disabilities), components should always have specialized training available for users with disabilities. As shown in Software Appendix B (Question-by-Question Responses to the Software Accessibility Checklist, Statistics by Agency Size), of the 882 responses where components chose a "no" or "not applicable" response, 322 were "not applicable" responses (19.2%); and 560 were "no" responses (33.4%). The other 794 components chose "yes" responses (47.4%).

[9] Other agencies, including GSA's Center for IT Accommodation, the Social Security Administration, and the Department of Defense's CAP Center, also expressed a willingness to assist other agencies in performing comprehensive and meaningful self-evaluations.

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[10] Other reviewers evaluated software packages using only accessibility features built into the operating system (62 responses) or accessibility aids, such as screen enlargement software (12 responses). For a very small number of other software packages (5 responses), components responded that testing was unnecessary because the software did not provide a commonly used user interface (e.g., anti-virus software that is not activated or operated by the user).

[11] Since the Federal Government is a valuable customer of information technology, section 508 requires that federal agencies develop, procure, maintain, and use electronic and information technology that is accessible to persons with disabilities. Private software developers have a very strong incentive for making their products accessible. Some software companies, such as Microsoft and Sun Microsystems, were active participants in the Access Board's Electronic and Information Technology Access Advisory Committee (EITAAC), which developed recommendations for the eventual Section 508 Standards to be issued by the Access Board. Private software companies will also play a valuable role in responding to the Access Board's Notice of Proposed Rulemaking.

[12] In reference to Question 29, the range of percentages where specialized training was unavailable to users with disabilities can be explained by whether a "not applicable" was considered an acceptable response to this question.

*Software Appendix A*[1]

## Data Tables

**Table 1: Software Not Providing Keyboard Equivalent Actions for All Mouse Actions (Q1)**

| Type of Agency | Number / Total |
|---|---|
| Overall (All Agencies) | 221 / 1676 |
| Cabinet Level Agencies | 129 / 959 |
| All Large Agencies | 19 / 207 |
| All Medium Agencies | 34 / 185 |
| All Small Agencies | 16 / 168 |
| All Very Small Agencies | 23 / 157 |

**Table 2: Software Not Providing Clear and Precise Instructions for all Keyboard Functions as Part of the User Documentation (Q2)**

| Type of Agency | Number / Total |
|---|---|
| Overall (All Agencies) | 428 / 1676 |
| Cabinet Level Agencies | 250 / 959 |
| All Large Agencies | 48 / 207 |
| All Medium Agencies | 54 / 185 |
| All Small Agencies | 39 / 168 |
| All Very Small Agencies | 37 / 157 |

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[1] This document is available on the Department of Justice's section 508 Web site (www.usdoj.gov/crt/508). People with disabilities may request copies in Braille, large print, or on computer disk by calling 1-800-514-0301 (voice) or 1-800-514-0383 (TTY).

**Table 3: Software Without Widely Available Keyboard Instructions Available to All Users in Component (Q3)**

| Type of Agency | Number / Total |
|---|---|
| Overall (All Agencies) | 496 / 1676 |
| Cabinet Level Agencies | 310 / 959 |
| All Large Agencies | 43 / 207 |
| All Medium Agencies | 52 / 185 |
| All Small Agencies | 43 / 168 |
| All Very Small Agencies | 48 / 157 |

**Table 4: Software Not Providing a Logical Tabbing Order Among Fields, Text Boxes, and Focal Points (Q4)**

| Type of Agency | Number / Total |
|---|---|
| Overall (All Agencies) | 232 / 1676 |
| Cabinet Level Agencies | 143 / 959 |
| All Large Agencies | 19 / 207 |
| All Medium Agencies | 31 / 185 |
| All Small Agencies | 11 / 168 |
| All Very Small Agencies | 28 / 157 |

| Table 5: Software Where Focus Does Not Follow Logical Tabbing Order In Navigating Screens and Dialog Boxes (Q5) | |
|---|---|
| **Type of Agency** | **Number / Total** |
| Overall (All Agencies) | 233 / 1676 |
| Cabinet Level Agencies | 148 / 959 |
| All Large Agencies | 16 / 207 |
| All Medium Agencies | 35 / 185 |
| All Small Agencies | 10 / 168 |
| All Very Small Agencies | 24 / 157 |

| Table 6: Software Where Focal Point Is Not Well-Defined or Not Providing Movement Through Keyboard Navigation (Q6) | |
|---|---|
| **Type of Agency** | **Number / Total** |
| Overall (All Agencies) | 300 / 1676 |
| Cabinet Level Agencies | 183 / 959 |
| All Large Agencies | 30 / 207 |
| All Medium Agencies | 44 / 185 |
| All Small Agencies | 13 / 168 |
| All Very Small Agencies | 30 / 157 |

| Table 7: Software Without Shortcut Keys to All Pull-down Menus (Q7) | |
|---|---|
| **Type of Agency** | **Number / Total** |
| Overall (All Agencies) | 618 / 1676 |
| Cabinet Level Agencies | 356 / 959 |
| All Large Agencies | 123 / 207 |
| All Medium Agencies | 67 / 185 |
| All Small Agencies | 33 / 168 |
| All Very Small Agencies | 39 / 157 |

| Table 8: Software That Does Not Support Existing Accessibility Features Built Into the Operating System (Q8) | |
|---|---|
| **Type of Agency** | **Number / Total** |
| Overall (All Agencies) | 236 / 1676 |
| Cabinet Level Agencies | 160 / 959 |
| All Large Agencies | 18 / 207 |
| All Medium Agencies | 27 / 185 |
| All Small Agencies | 21 / 168 |
| All Very Small Agencies | 10 / 157 |

**Table 9: Software Requiring a Timed Response that Does Not Permit Users to Modify the Timing Parameters (Q9)**

| Type of Agency | Number / Total |
|---|---|
| Overall (All Agencies) | 185 / 1676 |
| Cabinet Level Agencies | 107 / 959 |
| All Large Agencies | 27 / 207 |
| All Medium Agencies | 36 / 185 |
| All Small Agencies | 10 / 168 |
| All Very Small Agencies | 5 / 157 |

**Table 10: Software Not Providing Descriptions and Labels for Fields in a Manner that is Easy for Screen Reading Software to Associate Labels with Corresponding Fields (Q10)**

| Type of Agency | Number / Total |
|---|---|
| Overall (All Agencies) | 402 / 1676 |
| Cabinet Level Agencies | 208 / 959 |
| All Large Agencies | 75 / 207 |
| All Medium Agencies | 51 / 185 |
| All Small Agencies | 40 / 168 |
| All Very Small Agencies | 28 / 157 |

| Table 11: Software Without Clearly Named Labels for Every Window, Object, and Control (Q11) | |
|---|---|
| **Type of Agency** | **Number / Total** |
| Overall (All Agencies) | 139 / 1676 |
| Cabinet Level Agencies | 77 / 959 |
| All Large Agencies | 15 / 207 |
| All Medium Agencies | 14 / 185 |
| All Small Agencies | 22 / 168 |
| All Very Small Agencies | 11 / 157 |

| Table 12: Software That Uses Owner-Drawn or Custom Controls (Q12) | |
|---|---|
| **Type of Agency** | **Number / Total** |
| Overall (All Agencies) | 249 / 1676 |
| Cabinet Level Agencies | 158 / 959 |
| All Large Agencies | 25 / 207 |
| All Medium Agencies | 28 / 185 |
| All Small Agencies | 15 / 168 |
| All Very Small Agencies | 23 / 157 |

| Table 13: Software Without Option for Displaying Text on Icons (Q13) | |
|---|---|
| **Type of Agency** | **Number / Total** |
| Overall (All Agencies) | 296 / 1676 |
| Cabinet Level Agencies | 160 / 959 |
| All Large Agencies | 41 / 207 |
| All Medium Agencies | 37 / 185 |
| All Small Agencies | 29 / 168 |
| All Very Small Agencies | 29 / 157 |

| Table 14: Software Not Providing Use of Icons Consistently (Q14) | |
|---|---|
| **Type of Agency** | **Number / Total** |
| Overall (All Agencies) | 76 / 1676 |
| Cabinet Level Agencies | 49 / 959 |
| All Large Agencies | 6 / 207 |
| All Medium Agencies | 10 / 185 |
| All Small Agencies | 7 / 168 |
| All Very Small Agencies | 4 / 157 |

| Table 15: Software Not Providing Menus with text Equivalents for all Icon Features on Menu, Tool, and Format Bars (Q15) | |
|---|---|
| **Type of Agency** | **Number / Total** |
| Overall (All Agencies) | 149 / 1676 |
| Cabinet Level Agencies | 75 / 959 |
| All Large Agencies | 24 / 207 |
| All Medium Agencies | 25 / 185 |
| All Small Agencies | 11 / 168 |
| All Very Small Agencies | 14 / 157 |

| Table 16: Software Not Providing Visual Alerts for All Audio Alerts (Q16) | |
|---|---|
| **Type of Agency** | **Number / Total** |
| Overall (All Agencies) | 167 / 1676 |
| Cabinet Level Agencies | 97 / 959 |
| All Large Agencies | 17 / 207 |
| All Medium Agencies | 18 / 185 |
| All Small Agencies | 19 / 168 |
| All Very Small Agencies | 16 / 157 |

**Table 17: Software Not Supporting the "Show Sounds" Feature Built into the Operating System (Q17)**

| Type of Agency | Number / Total |
|---|---|
| Overall (All Agencies) | 305 / 1676 |
| Cabinet Level Agencies | 151 / 959 |
| All Large Agencies | 42 / 207 |
| All Medium Agencies | 42 / 185 |
| All Small Agencies | 43 / 168 |
| All Very Small Agencies | 27 / 157 |

**Table 18: Software Not Permitting User to Disable or Adjust Sound Volume (Q18)**

| Type of Agency | Number / Total |
|---|---|
| Overall (All Agencies) | 175 / 1676 |
| Cabinet Level Agencies | 102 / 959 |
| All Large Agencies | 13 / 207 |
| All Medium Agencies | 19 / 185 |
| All Small Agencies | 30 / 168 |
| All Very Small Agencies | 11 / 157 |

| **Table 19: Software with Audio Output that Is Not Displayed in a Visual Format (Q19)** | |
|---|---|
| **Type of Agency** | **Number / Total** |
| Overall (All Agencies) | 225 / 1676 |
| Cabinet Level Agencies | 117 / 959 |
| All Large Agencies | 28 / 207 |
| All Medium Agencies | 33 / 185 |
| All Small Agencies | 27 / 168 |
| All Very Small Agencies | 20 / 157 |

| **Table 20: Software with Patterned Backgrounds Behind Text or Important Graphics (Q20)** | |
|---|---|
| **Type of Agency** | **Number / Total** |
| Overall (All Agencies) | 265 / 1676 |
| Cabinet Level Agencies | 156 / 959 |
| All Large Agencies | 24 / 207 |
| All Medium Agencies | 49 / 185 |
| All Small Agencies | 16 / 168 |
| All Very Small Agencies | 20 / 157 |

| Table 21: Software Not Permitting User to Override Default Fonts for Printing and Text Displays (Q21) | |
|---|---|
| **Type of Agency** | **Number / Total** |
| Overall (All Agencies) | 472 / 1676 |
| Cabinet Level Agencies | 271 / 959 |
| All Large Agencies | 68 / 207 |
| All Medium Agencies | 55 / 185 |
| All Small Agencies | 41 / 168 |
| All Very Small Agencies | 37 / 157 |

| Table 22: Software Not Permitting User to Adjust or Disable Flashing, Rotating, or Moving Displays (Q22) | |
|---|---|
| **Type of Agency** | **Number / Total** |
| Overall (All Agencies) | 240 / 1676 |
| Cabinet Level Agencies | 126 / 959 |
| All Large Agencies | 36 / 207 |
| All Medium Agencies | 28 / 185 |
| All Small Agencies | 33 / 168 |
| All Very Small Agencies | 17 / 157 |

| **Table 23: Software that Does Not Use Color-Coding as the Only Means of Conveying Information or Indicating an Action (Q23)** | |
|---|---|
| **Type of Agency** | **Number / Total** |
| Overall (All Agencies) | 220 / 1676 |
| Cabinet Level Agencies | 122 / 959 |
| All Large Agencies | 25 / 207 |
| All Medium Agencies | 49 / 185 |
| All Small Agencies | 13 / 168 |
| All Very Small Agencies | 11 / 157 |

| **Table 24: Software Not Supporting User-Defined Color Settings System-Wide (Q24)** | |
|---|---|
| **Type of Agency** | **Number / Total** |
| Overall (All Agencies) | 294 / 1676 |
| Cabinet Level Agencies | 147 / 959 |
| All Large Agencies | 52 / 207 |
| All Medium Agencies | 51 / 185 |
| All Small Agencies | 22 / 168 |
| All Very Small Agencies | 22 / 157 |

| Table 25: Software Not Permitting Highlighted Text to Be Displayed in Inverted Colors (Q25) | |
|---|---|
| **Type of Agency** | **Number / Total** |
| Overall (All Agencies) | 260 / 1676 |
| Cabinet Level Agencies | 134 / 959 |
| All Large Agencies | 54 / 207 |
| All Medium Agencies | 39 / 185 |
| All Small Agencies | 8 / 168 |
| All Very Small Agencies | 25 / 157 |

| Table 26: Software that Draws Its Own Screen Elements, but Does Not Pick Up Size Settings Set by User in the Control Panel (Q26) | |
|---|---|
| **Type of Agency** | **Number / Total** |
| Overall (All Agencies) | 247 / 1676 |
| Cabinet Level Agencies | 136 / 959 |
| All Large Agencies | 35 / 207 |
| All Medium Agencies | 25 / 185 |
| All Small Agencies | 33 / 168 |
| All Very Small Agencies | 18 / 157 |

| Table 27: Software where Manuals and Documentation are not Provided in Electronic Format, including ASCII Text with Text Descriptions of Charts, Graphs, Pictures, or Graphics (Q27) | |
|---|---|
| **Type of Agency** | **Number / Total** |
| Overall (All Agencies) | 612 / 1676 |
| Cabinet Level Agencies | 354 / 959 |
| All Large Agencies | 93 / 207 |
| All Medium Agencies | 67 / 185 |
| All Small Agencies | 52 / 168 |
| All Very Small Agencies | 46 / 157 |

| Table 28: Software Generating Reports Without an Option to Allow User to Have Report Made Available in ASCII Format (Q28) | |
|---|---|
| **Type of Agency** | **Number / Total** |
| Overall (All Agencies) | 430 / 1676 |
| Cabinet Level Agencies | 270 / 959 |
| All Large Agencies | 62 / 207 |
| All Medium Agencies | 44 / 185 |
| All Small Agencies | 33 / 168 |
| All Very Small Agencies | 21 / 157 |

**Table 29: Special Training Not Provided for Users with Disabilities and for Use of Software in Conjunction with Assistive Technology (Q29)**

| Type of Agency | Number / Total |
|---|---|
| Overall (All Agencies) | 882 / 1676 |
| Cabinet Level Agencies | 464 / 959 |
| All Large Agencies | 120 / 207 |
| All Medium Agencies | 92 / 185 |
| All Small Agencies | 110 / 168 |
| All Very Small Agencies | 96 / 157 |

**Table 30: Software Potentially Excluding Users who are Hard of Hearing**

| **Problem Identified** | **Overall** | **Cabinet Agencies** | **Large Agencies** | **Medium Agencies** | **Small Agencies** | **Very Small Agencies** |
|---|---|---|---|---|---|---|
| Question 8 (no only) | 236 / 1676 | 160 / 959 | 18 / 207 | 27 / 185 | 21 / 168 | 10 / 157 |
| Question 16 (no only) | 167 / 1676 | 97 / 959 | 17 / 207 | 18 / 185 | 19 / 168 | 16 / 157 |
| Question 17 (no only) | 305 / 1676 | 151 / 959 | 42 / 207 | 42 / 185 | 43 / 168 | 27 / 157 |
| Question 18 (no only) | 175 / 1676 | 102 / 959 | 13 / 207 | 19 / 185 | 30 / 168 | 11 / 157 |
| Question 19 (no only) | 225 / 1676 | 117 / 959 | 28 / 207 | 33 / 185 | 27 / 168 | 20 / 157 |
| Question 29 (no or not applicable) | 882 / 1676 | 464 / 959 | 120 / 207 | 92 / 185 | 110 / 168 | 96 / 157 |
| **Surveyed items that did not meet all of the above survey questions** | 28 / 1676 | 18 / 959 | 0 / 207 | 2 / 185 | 6 / 168 | 2 / 157 |
| **Surveyed items that did not meet one or more of the above survey questions** | 1137 / 1676 | 625 / 959 | 149 / 207 | 117 / 185 | 130 / 168 | 116 / 157 |

**Table 31: Software Potentially Excluding Users Who are Deaf**

| Problem Identified | Overall | Cabinet Agencies | Large Agencies | Medium Agencies | Small Agencies | Very Small Agencies |
|---|---|---|---|---|---|---|
| Question 8 (no only) | 236 / 1676 | 160 / 959 | 18 / 207 | 27 / 185 | 21 / 168 | 10 / 157 |
| Question 16 (no only) | 167 / 1676 | 97 / 959 | 17 / 207 | 18 / 185 | 19 / 168 | 16 / 157 |
| Question 17 (no only) | 305 / 1676 | 151 / 959 | 42 / 207 | 42 / 185 | 43 / 168 | 27 / 157 |
| Question 19 (no only) | 225 / 1676 | 117 / 959 | 28 / 207 | 33 / 185 | 27 / 168 | 20 / 157 |
| Question 29 (no or not applicable) | 882 / 1676 | 464 / 959 | 120 / 207 | 92 / 185 | 110 / 168 | 96 / 157 |
| **Surveyed items that did not meet all of the above survey questions** | 34 / 1676 | 19 / 959 | 3 / 207 | 4 / 185 | 6 / 168 | 2 / 157 |
| **Surveyed items that did not meet one or more of the above survey questions** | 1113 / 1676 | 605 / 959 | 148 / 207 | 117 / 185 | 129 / 168 | 114 / 157 |

**Table 32: Software Potentially Excluding Users With Low Vision Who are Either Deaf or Who are Hard of Hearing**

| Problem Identified | Overall | Cabinet Agencies | Large Agencies | Medium Agencies | Small Agencies | Very Small Agencies |
|---|---|---|---|---|---|---|
| Question 1 (no only) | 221 / 1676 | 129 / 959 | 19 / 207 | 34 / 185 | 16 / 168 | 23 / 157 |
| Question 2 (no or not applicable) | 428 / 1676 | 250 / 959 | 48 / 207 | 54 / 185 | 39 / 168 | 37 / 157 |
| Question 3 (no or not applicable) | 496 / 1676 | 310 / 959 | 43 / 207 | 52 / 185 | 43 / 168 | 48 / 157 |
| Question 4 (no or not applicable) | 232 / 1676 | 143 / 959 | 19 / 207 | 31 / 185 | 11 / 168 | 28 / 157 |
| Question 5 (no or not applicable) | 233 / 1676 | 148 / 959 | 16 / 207 | 35 / 185 | 10 / 168 | 24 / 157 |
| Question 6 (no or not applicable) | 300 / 1676 | 183 / 959 | 30 / 207 | 44 / 185 | 13 / 168 | 30 / 157 |
| Question 7 (no or not applicable) | 618 / 1676 | 356 / 959 | 123 / 207 | 67 / 185 | 33 / 168 | 39 / 157 |
| Question 8 (no only) | 236 / 1676 | 160 / 959 | 18 / 207 | 27 / 185 | 21 / 168 | 10 / 157 |
| Question 9 (no only) | 185 / 1676 | 107 / 959 | 27 / 207 | 36 / 185 | 10 / 168 | 5 / 157 |
| Question 11 (no only) | 139 / 1676 | 77 / 959 | 15 / 207 | 14 / 185 | 22 / 168 | 11 / 157 |
| Question 13 (no only) | 296 / 1676 | 160 / 959 | 41 / 207 | 37 / 185 | 29 / 168 | 29 / 157 |
| Question 14 (no only) | 76 / 1676 | 49 / 959 | 6 / 207 | 10 / 185 | 7 / 168 | 4 / 157 |
| Question 15 (no only) | 149 / 1676 | 75 / 959 | 24 / 207 | 25 / 185 | 11 / 168 | 14 / 157 |
| Question 20 (no or not applicable) | 265 / 1676 | 156 / 959 | 24 / 207 | 49 / 185 | 16 / 168 | 20 / 157 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Question 21 (no or not applicable) | 472 / 1676 | 271 / 959 | 68 / 207 | 55 / 185 | 41 / 168 | 37 / 157 |
| Question 23 (no only) | 220 / 1676 | 122 / 959 | 25 / 207 | 49 / 185 | 13 / 168 | 11 / 157 |
| Question 24 (no only) | 294 / 1676 | 147 / 959 | 52 / 207 | 51 / 185 | 22 / 168 | 22 / 157 |
| Question 25 (no only) | 260 / 1676 | 134 / 959 | 54 / 207 | 39 / 185 | 8 / 168 | 25 / 157 |
| Question 26 (no only) | 247 / 1676 | 136 / 959 | 35 / 207 | 25 / 185 | 33 / 168 | 18 / 157 |
| Question 27 (no only) | 612 / 1676 | 354 / 959 | 93 / 207 | 67 / 185 | 52 / 168 | 46 / 157 |
| Question 28 (no only) | 430 / 1676 | 270 / 959 | 62 / 207 | 44 / 185 | 33 / 168 | 21 / 157 |
| Question 29 (no or not applicable) | 882 / 1676 | 464 / 959 | 120 / 207 | 92 / 185 | 110 / 168 | 96 / 157 |
| **Surveyed items that did not meet all of the above survey questions** | 13 / 1676 | 11 / 959 | 0 / 207 | 0 / 185 | 0 / 168 | 2 / 157 |
| **Surveyed items that did not meet one or more of the above survey questions** | 1413 / 1676 | 771 / 959 | 194 / 207 | 164 / 185 | 151 / 168 | 133 / 157 |

| **Table 33: Software Potentially Excluding Users With Lack of Color Perception and Who are Either Deaf or Who are Hard of Hearing** | | | | | | |
|---|---|---|---|---|---|---|
| **Problem Identified** | **Overall** | **Cabinet Agencies** | **Large Agencies** | **Medium Agencies** | **Small Agencies** | **Very Small Agencies** |
| Question 20 (no or not applicable) | 265 / 1676 | 156 / 959 | 24 / 207 | 49 / 185 | 16 / 168 | 20 / 157 |
| Question 23 (no only) | 220 / 1676 | 122 / 959 | 25 / 207 | 49 / 185 | 13 / 168 | 11 / 157 |
| Question 24 (no only) | 294 / 1676 | 147 / 959 | 52 / 207 | 51 / 185 | 22 / 168 | 22 / 157 |
| Question 25 (no only) | 260 / 1676 | 134 / 959 | 54 / 207 | 39 / 185 | 8 / 168 | 25 / 157 |
| Question 29 (no or not applicable) | 882 / 1676 | 464 / 959 | 120 / 207 | 92 / 185 | 110 / 168 | 96 / 157 |
| **Surveyed items that did not meet all of the above survey questions** | 27 / 1676 | 19 / 959 | 2 / 207 | 2 / 185 | 2 / 168 | 2 / 157 |
| **Surveyed items that did not meet one or more of the above survey questions** | 1125 / 1676 | 587 / 959 | 160 / 207 | 141 / 185 | 127 / 168 | 110 / 157 |

**Table 34: Software Potentially Excluding Users who are Blind and Deaf**

| Problem Identified | Overall | Cabinet Agencies | Large Agencies | Medium Agencies | Small Agencies | Very Small Agencies |
|---|---|---|---|---|---|---|
| Question 1 (no only) | 221 / 1676 | 129 / 959 | 19 / 207 | 34 / 185 | 16 / 168 | 23 / 157 |
| Question 2 (no or not applicable) | 428 / 1676 | 250 / 959 | 48 / 207 | 54 / 185 | 39 / 168 | 37 / 157 |
| Question 3 (no or not applicable) | 496 / 1676 | 310 / 959 | 43 / 207 | 52 / 185 | 43 / 168 | 48 / 157 |
| Question 4 (no or not applicable) | 232 / 1676 | 143 / 959 | 19 / 207 | 31 / 185 | 11 / 168 | 28 / 157 |
| Question 5 (no or not applicable) | 233 / 1676 | 148 / 959 | 16 / 207 | 35 / 185 | 10 / 168 | 24 / 157 |
| Question 6 (no or not applicable) | 300 / 1676 | 183 / 959 | 30 / 207 | 44 / 185 | 13 / 168 | 30 / 157 |
| Question 7 (no or not applicable) | 618 / 1676 | 356 / 959 | 123 / 207 | 67 / 185 | 33 / 168 | 39 / 157 |
| Question 8 (no or not applicable) | 533 / 1676 | 349 / 959 | 50 / 207 | 62 / 185 | 37 / 168 | 35 / 157 |
| Question 9 (no or not applicable) | 1383 / 1676 | 769 / 959 | 192 / 207 | 165 / 185 | 124 / 168 | 133 / 157 |
| Question 11 (no only) | 139 / 1676 | 77 / 959 | 15 / 207 | 14 / 185 | 22 / 168 | 11 / 157 |
| Question 13 (no only) | 296 / 1676 | 160 / 959 | 41 / 207 | 37 / 185 | 29 / 168 | 29 / 157 |
| Question 14 (no only) | 76 / 1676 | 49 / 959 | 6 / 207 | 10 / 185 | 7 / 168 | 4 / 157 |
| Question 15 (no only) | 149 / 1676 | 75 / 959 | 24 / 207 | 25 / 185 | 11 / 168 | 14 / 157 |
| Question 23 (no only) | 220 / 1676 | 122 / 959 | 25 / 207 | 49 / 185 | 13 / 168 | 11 / 157 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Question 27 (no only) | 612 / 1676 | 354 / 959 | 93 / 207 | 67 / 185 | 52 / 168 | 46 / 157 |
| Question 28 (no only) | 430 / 1676 | 270 / 959 | 62 / 207 | 44 / 185 | 33 / 168 | 21 / 157 |
| Question 29 (no or not applicable) | 882 / 1676 | 464 / 959 | 120 / 207 | 92 / 185 | 110 / 168 | 96 / 157 |
| **Surveyed items that did not meet all of the above survey questions** | 13 / 1676 | 11 / 959 | 0 / 207 | 0 / 185 | 0 / 168 | 2 / 157 |
| **Surveyed items that did not meet one or more of the above survey questions** | 1550 / 1676 | 854 / 959 | 205 / 207 | 182 / 185 | 162 / 168 | 147 / 157 |

**Table 35: Software Potentially Excluding Users who are Blind and Hard of Hearing**

| Problem Identified | Overall | Cabinet Agencies | Large Agencies | Medium Agencies | Small Agencies | Very Small Agencies |
|---|---|---|---|---|---|---|
| Question 1 (no only) | 221 / 1676 | 129 / 959 | 19 / 207 | 34 / 185 | 16 / 168 | 23 / 157 |
| Question 2 (no or not applicable) | 428 / 1676 | 250 / 959 | 48 / 207 | 54 / 185 | 39 / 168 | 37 / 157 |
| Question 3 (no or not applicable) | 496 / 1676 | 310 / 959 | 43 / 207 | 52 / 185 | 43 / 168 | 48 / 157 |
| Question 4 (no or not applicable) | 232 / 1676 | 143 / 959 | 19 / 207 | 31 / 185 | 11 / 168 | 28 / 157 |
| Question 5 (no or not applicable) | 233 / 1676 | 148 / 959 | 16 / 207 | 35 / 185 | 10 / 168 | 24 / 157 |
| Question 6 (no or not applicable) | 300 / 1676 | 183 / 959 | 30 / 207 | 44 / 185 | 13 / 168 | 30 / 157 |
| Question 7 (no or not applicable) | 618 / 1676 | 356 / 959 | 123 / 207 | 67 / 185 | 33 / 168 | 39 / 157 |
| Question 8 (no or not applicable) | 533 / 1676 | 349 / 959 | 50 / 207 | 62 / 185 | 37 / 168 | 35 / 157 |
| Question 9 (no or not applicable) | 1383 / 1676 | 769 / 959 | 192 / 207 | 165 / 185 | 124 / 168 | 133 / 157 |
| Question 11 (no only) | 139 / 1676 | 77 / 959 | 15 / 207 | 14 / 185 | 22 / 168 | 11 / 157 |
| Question 13 (no only) | 296 / 1676 | 160 / 959 | 41 / 207 | 37 / 185 | 29 / 168 | 29 / 157 |
| Question 14 (no only) | 76 / 1676 | 49 / 959 | 6 / 207 | 10 / 185 | 7 / 168 | 4 / 157 |
| Question 15 (no only) | 149 / 1676 | 75 / 959 | 24 / 207 | 25 / 185 | 11 / 168 | 14 / 157 |
| Question 27 (no only) | 612 / 1676 | 354 / 959 | 93 / 207 | 67 / 185 | 52 / 168 | 46 / 157 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Question 28 (no only) | 430 / 1676 | 270 / 959 | 62 / 207 | 44 / 185 | 33 / 168 | 21 / 157 |
| Question 29 (no or not applicable) | 882 / 1676 | 464 / 959 | 120 / 207 | 92 / 185 | 110 / 168 | 96 / 157 |
| **Surveyed items that did not meet all of the above survey questions** | 13 / 1676 | 11 / 959 | 0 / 207 | 0 / 185 | 0 / 168 | 2 / 157 |
| **Surveyed items that did not meet one or more of the above survey questions** | 1548 / 1676 | 852 / 959 | 205 / 207 | 182 / 185 | 162 / 168 | 147 / 157 |

**Table 36: Software Potentially Excluding Users who are Blind**

| Problem Identified | Overall | Cabinet Agencies | Large Agencies | Medium Agencies | Small Agencies | Very Small Agencies |
|---|---|---|---|---|---|---|
| Question 1 (no only) | 221 / 1676 | 129 / 959 | 19 / 207 | 34 / 185 | 16 / 168 | 23 / 157 |
| Question 2 (no or not applicable) | 428 / 1676 | 250 / 959 | 48 / 207 | 54 / 185 | 39 / 168 | 37 / 157 |
| Question 3 (no or not applicable) | 496 / 1676 | 310 / 959 | 43 / 207 | 52 / 185 | 43 / 168 | 48 / 157 |
| Question 4 (no or not applicable) | 232 / 1676 | 143 / 959 | 19 / 207 | 31 / 185 | 11 / 168 | 28 / 157 |
| Question 5 (no or not applicable) | 233 / 1676 | 148 / 959 | 16 / 207 | 35 / 185 | 10 / 168 | 24 / 157 |
| Question 6 (no or not applicable) | 300 / 1676 | 183 / 959 | 30 / 207 | 44 / 185 | 13 / 168 | 30 / 157 |
| Question 7 (no or not applicable) | 618 / 1676 | 356 / 959 | 123 / 207 | 67 / 185 | 33 / 168 | 39 / 157 |
| Question 8 (no or not applicable) | 533 / 1676 | 349 / 959 | 50 / 207 | 62 / 185 | 37 / 168 | 35 / 157 |
| Question 9 (no or not applicable) | 1383 / 1676 | 769 / 959 | 192 / 207 | 165 / 185 | 124 / 168 | 133 / 157 |
| Question 10 (no only) | 402 / 1676 | 208 / 959 | 75 / 207 | 51 / 185 | 40 / 168 | 28 / 157 |
| Question 11 (no only) | 139 / 1676 | 77 / 959 | 15 / 207 | 14 / 185 | 22 / 168 | 11 / 157 |
| Question 12 (no or not applicable) | 249 / 1676 | 158 / 959 | 25 / 207 | 28 / 185 | 15 / 168 | 23 / 157 |
| Question 13 (no only) | 296 / 1676 | 160 / 959 | 41 / 207 | 37 / 185 | 29 / 168 | 29 / 157 |
| Question 14 (no only) | 76 / 1676 | 49 / 959 | 6 / 207 | 10 / 185 | 7 / 168 | 4 / 157 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Question 15 (no only) | 149 / 1676 | 75 / 959 | 24 / 207 | 25 / 185 | 11 / 168 | 14 / 157 |
| Question 23 (no only) | 220 / 1676 | 122 / 959 | 25 / 207 | 49 / 185 | 13 / 168 | 11 / 157 |
| Question 27 (no only) | 612 / 1676 | 354 / 959 | 93 / 207 | 67 / 185 | 52 / 168 | 46 / 157 |
| Question 28 (no only) | 430 / 1676 | 270 / 959 | 62 / 207 | 44 / 185 | 33 / 168 | 21 / 157 |
| Question 29 (no or not applicable) | 882 / 1676 | 464 / 959 | 120 / 207 | 92 / 185 | 110 / 168 | 96 / 157 |
| **Surveyed items that did not meet all of the above survey questions** | 13 / 1676 | 11 / 959 | 0 / 207 | 0 / 185 | 0 / 168 | 2 / 157 |
| **Surveyed items that did not meet one or more of the above survey questions** | 1552 / 1676 | 856 / 959 | 205 / 207 | 182 / 185 | 162 / 168 | 147 / 157 |

**Table 37: Software Affecting Users Having Difficulty Using or Discerning Colors — Broader Set of Questions**

| Problem Identified | Overall | Cabinet Agencies | Large Agencies | Medium Agencies | Small Agencies | Very Small Agencies |
|---|---|---|---|---|---|---|
| Question 20 (no or not applicable) | 265 / 1676 | 156 / 959 | 24 / 207 | 49 / 185 | 16 / 168 | 20 / 157 |
| Question 23 (no only) | 220 / 1676 | 122 / 959 | 25 / 207 | 49 / 185 | 13 / 168 | 11 / 157 |
| Question 24 (no only) | 294 / 1676 | 147 / 959 | 52 / 207 | 51 / 185 | 22 / 168 | 22 / 157 |
| Question 25 (no only) | 260 / 1676 | 134 / 959 | 54 / 207 | 39 / 185 | 8 / 168 | 25 / 157 |
| Question 29 (no or not applicable) | 882 / 1676 | 464 / 959 | 120 / 207 | 92 / 185 | 110 / 168 | 96 / 157 |
| **Surveyed items that did not meet all of the above survey questions** | 27 / 1676 | 19 / 959 | 2 / 207 | 2 / 185 | 2 / 168 | 2 / 157 |
| **Surveyed items that did not meet one or more of the above survey questions** | 1125 / 1676 | 587 / 959 | 160 / 207 | 141 / 185 | 127 / 168 | 110 / 157 |

**Table 38: Software Affecting Users Having Difficulty Using or Discerning Colors — Targeted Set of Questions**

| Problem Identified | Overall | Cabinet Agencies | Large Agencies | Medium Agencies | Small Agencies | Very Small Agencies |
|---|---|---|---|---|---|---|
| Question 23 (no only) | 220 / 1676 | 122 / 959 | 25 / 207 | 49 / 185 | 13 / 168 | 11 / 157 |
| Question 24 (no only) | 294 / 1676 | 147 / 959 | 52 / 207 | 51 / 185 | 22 / 168 | 22 / 157 |
| Question 25 (no only) | 260 / 1676 | 134 / 959 | 54 / 207 | 39 / 185 | 8 / 168 | 25 / 157 |
| **Surveyed items that did not meet all of the above survey questions** | 66 / 1676 | 38 / 959 | 5 / 207 | 16 / 185 | 4 / 168 | 3 / 157 |
| **Surveyed items that did not meet one or more of the above survey questions** | 494 / 1676 | 252 / 959 | 86 / 207 | 82 / 185 | 31 / 168 | 43 / 157 |

**Table 39: Software Creating Potential Barriers to Users with Low Vision**

| Problem Identified | Overall | Cabinet Agencies | Large Agencies | Medium Agencies | Small Agencies | Very Small Agencies |
|---|---|---|---|---|---|---|
| Question 1 (no only) | 221 / 1676 | 129 / 959 | 19 / 207 | 34 / 185 | 16 / 168 | 23 / 157 |
| Question 2 (no or not applicable) | 428 / 1676 | 250 / 959 | 48 / 207 | 54 / 185 | 39 / 168 | 37 / 157 |
| Question 3 (no or not applicable) | 496 / 1676 | 310 / 959 | 43 / 207 | 52 / 185 | 43 / 168 | 48 / 157 |
| Question 4 (no or not applicable) | 232 / 1676 | 143 / 959 | 19 / 207 | 31 / 185 | 11 / 168 | 28 / 157 |
| Question 5 (no or not applicable) | 233 / 1676 | 148 / 959 | 16 / 207 | 35 / 185 | 10 / 168 | 24 / 157 |
| Question 6 (no or not applicable) | 300 / 1676 | 183 / 959 | 30 / 207 | 44 / 185 | 13 / 168 | 30 / 157 |
| Question 7 (no or not applicable) | 618 / 1676 | 356 / 959 | 123 / 207 | 67 / 185 | 33 / 168 | 39 / 157 |
| Question 8 (no or not applicable) | 533 / 1676 | 349 / 959 | 50 / 207 | 62 / 185 | 37 / 168 | 35 / 157 |
| Question 9 (no or not applicable) | 1383 / 1676 | 769 / 959 | 192 / 207 | 165 / 185 | 124 / 168 | 133 / 157 |
| Question 10 (no only) | 402 / 1676 | 208 / 959 | 75 / 207 | 51 / 185 | 40 / 168 | 28 / 157 |
| Question 11 (no only) | 139 / 1676 | 77 / 959 | 15 / 207 | 14 / 185 | 22 / 168 | 11 / 157 |
| Question 12 (no or not applicable) | 249 / 1676 | 158 / 959 | 25 / 207 | 28 / 185 | 15 / 168 | 23 / 157 |
| Question 13 (no only) | 296 / 1676 | 160 / 959 | 41 / 207 | 37 / 185 | 29 / 168 | 29 / 157 |
| Question 14 (no only) | 76 / 1676 | 49 / 959 | 6 / 207 | 10 / 185 | 7 / 168 | 4 / 157 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Question 15 (no only) | 149 / 1676 | 75 / 959 | 24 / 207 | 25 / 185 | 11 / 168 | 14 / 157 |
| Question 20 (no or not applicable) | 265 / 1676 | 156 / 959 | 24 / 207 | 49 / 185 | 16 / 168 | 20 / 157 |
| Question 21 (no or not applicable) | 472 / 1676 | 271 / 959 | 68 / 207 | 55 / 185 | 41 / 168 | 37 / 157 |
| Question 23 (no only) | 220 / 1676 | 122 / 959 | 25 / 207 | 49 / 185 | 13 / 168 | 11 / 157 |
| Question 24 (no only) | 294 / 1676 | 147 / 959 | 52 / 207 | 51 / 185 | 22 / 168 | 22 / 157 |
| Question 25 (no only) | 260 / 1676 | 134 / 959 | 54 / 207 | 39 / 185 | 8 / 168 | 25 / 157 |
| Question 26 (no only) | 247 / 1676 | 136 / 959 | 35 / 207 | 25 / 185 | 33 / 168 | 18 / 157 |
| Question 27 (no only) | 612 / 1676 | 354 / 959 | 93 / 207 | 67 / 185 | 52 / 168 | 46 / 157 |
| Question 28 (no only) | 430 / 1676 | 270 / 959 | 62 / 207 | 44 / 185 | 33 / 168 | 21 / 157 |
| Question 29 (no or not applicable) | 882 / 1676 | 464 / 959 | 120 / 207 | 92 / 185 | 110 / 168 | 96 / 157 |
| **Surveyed items that did not meet all of the above survey questions** | 13 / 1676 | 11 / 959 | 0 / 207 | 0 / 185 | 0 / 168 | 2 / 157 |
| **Surveyed items that did not meet one or more of the above survey questions** | 1560 / 1676 | 861 / 959 | 206 / 207 | 182 / 185 | 163 / 168 | 148 / 157 |

**Table 40: Software Affecting Users with Low Vision Who Do Not Require Screen Reading Software**

| **Problem Identified** | **Overall** | **Cabinet Agencies** | **Large Agencies** | **Medium Agencies** | **Small Agencies** | **Very Small Agencies** |
|---|---|---|---|---|---|---|
| Question 8 (no or not applicable) | 533 / 1676 | 349 / 959 | 50 / 207 | 62 / 185 | 37 / 168 | 35 / 157 |
| Question 9 (no or not applicable) | 1383 / 1676 | 769 / 959 | 192 / 207 | 165 / 185 | 124 / 168 | 133 / 157 |
| Question 14 (no only) | 76 / 1676 | 49 / 959 | 6 / 207 | 10 / 185 | 7 / 168 | 4 / 157 |
| Question 20 (no or not applicable) | 265 / 1676 | 156 / 959 | 24 / 207 | 49 / 185 | 16 / 168 | 20 / 157 |
| Question 21 (no or not applicable) | 472 / 1676 | 271 / 959 | 68 / 207 | 55 / 185 | 41 / 168 | 37 / 157 |
| Question 23 (no only) | 220 / 1676 | 122 / 959 | 25 / 207 | 49 / 185 | 13 / 168 | 11 / 157 |
| Question 24 (no only) | 294 / 1676 | 147 / 959 | 52 / 207 | 51 / 185 | 22 / 168 | 22 / 157 |
| Question 25 (no only) | 260 / 1676 | 134 / 959 | 54 / 207 | 39 / 185 | 8 / 168 | 25 / 157 |
| Question 26 (no only) | 247 / 1676 | 136 / 959 | 35 / 207 | 25 / 185 | 33 / 168 | 18 / 157 |
| Question 29 (no or not applicable) | 882 / 1676 | 464 / 959 | 120 / 207 | 92 / 185 | 110 / 168 | 96 / 157 |
| **Surveyed items that did not meet all of the above survey questions** | 18 / 1676 | 12 / 959 | 0 / 207 | 2 / 185 | 2 / 168 | 2 / 157 |
| **Surveyed items that did not meet one or more of the above survey questions** | 1524 / 1676 | 831 / 959 | 202 / 207 | 181 / 185 | 162 / 168 | 148 / 157 |

**Table 41: Software Affecting Users with Tremor or Limited Strength or Dexterity**

| **Problem Identified** | **Overall** | **Cabinet Agencies** | **Large Agencies** | **Medium Agencies** | **Small Agencies** | **Very Small Agencies** |
|---|---|---|---|---|---|---|
| Question 1 (no only) | 221 / 1676 | 129 / 959 | 19 / 207 | 34 / 185 | 16 / 168 | 23 / 157 |
| Question 2 (no or not applicable) | 428 / 1676 | 250 / 959 | 48 / 207 | 54 / 185 | 39 / 168 | 37 / 157 |
| Question 3 (no or not applicable) | 496 / 1676 | 310 / 959 | 43 / 207 | 52 / 185 | 43 / 168 | 48 / 157 |
| Question 4 (no or not applicable) | 232 / 1676 | 143 / 959 | 19 / 207 | 31 / 185 | 11 / 168 | 28 / 157 |
| Question 5 (no or not applicable) | 233 / 1676 | 148 / 959 | 16 / 207 | 35 / 185 | 10 / 168 | 24 / 157 |
| Question 6 (no or not applicable) | 300 / 1676 | 183 / 959 | 30 / 207 | 44 / 185 | 13 / 168 | 30 / 157 |
| Question 7 (no or not applicable) | 618 / 1676 | 356 / 959 | 123 / 207 | 67 / 185 | 33 / 168 | 39 / 157 |
| Question 8 (no or not applicable) | 533 / 1676 | 349 / 959 | 50 / 207 | 62 / 185 | 37 / 168 | 35 / 157 |
| Question 9 (no or not applicable) | 1383 / 1676 | 769 / 959 | 192 / 207 | 165 / 185 | 124 / 168 | 133 / 157 |
| Question 15 (no only) | 149 / 1676 | 75 / 959 | 24 / 207 | 25 / 185 | 11 / 168 | 14 / 157 |
| Question 29 (no or not applicable) | 882 / 1676 | 464 / 959 | 120 / 207 | 92 / 185 | 110 / 168 | 96 / 157 |
| **Surveyed items that did not meet all of the above survey questions** | 24 / 1676 | 18 / 959 | 2 / 207 | 2 / 185 | 0 / 168 | 2 / 157 |
| **Surveyed items that did not meet one or more of the above survey questions** | 1535 / 1676 | 842 / 959 | 203 / 207 | 181 / 185 | 162 / 168 | 147 / 157 |

| Table 42: Software Affecting Users with Cognitive Impairments or Learning Disabilities | | | | | | |
|---|---|---|---|---|---|---|
| **Problem Identified** | **Overall** | **Cabinet Agencies** | **Large Agencies** | **Medium Agencies** | **Small Agencies** | **Very Small Agencies** |
| Question 2 (no or not applicable) | 428 / 1676 | 250 / 959 | 48 / 207 | 54 / 185 | 39 / 168 | 37 / 157 |
| Question 3 (no or not applicable) | 496 / 1676 | 310 / 959 | 43 / 207 | 52 / 185 | 43 / 168 | 48 / 157 |
| Question 4 (no or not applicable) | 232 / 1676 | 143 / 959 | 19 / 207 | 31 / 185 | 11 / 168 | 28 / 157 |
| Question 5 (no or not applicable) | 233 / 1676 | 148 / 959 | 16 / 207 | 35 / 185 | 10 / 168 | 24 / 157 |
| Question 6 (no or not applicable) | 300 / 1676 | 183 / 959 | 30 / 207 | 44 / 185 | 13 / 168 | 30 / 157 |
| Question 7 (no or not applicable) | 618 / 1676 | 356 / 959 | 123 / 207 | 67 / 185 | 33 / 168 | 39 / 157 |
| Question 8 (no or not applicable) | 533 / 1676 | 349 / 959 | 50 / 207 | 62 / 185 | 37 / 168 | 35 / 157 |
| Question 9 (no or not applicable) | 1383 / 1676 | 769 / 959 | 192 / 207 | 165 / 185 | 124 / 168 | 133 / 157 |
| Question 11 (no only) | 139 / 1676 | 77 / 959 | 15 / 207 | 14 / 185 | 22 / 168 | 11 / 157 |
| Question 13 (no only) | 296 / 1676 | 160 / 959 | 41 / 207 | 37 / 185 | 29 / 168 | 29 / 157 |
| Question 14 (no only) | 76 / 1676 | 49 / 959 | 6 / 207 | 10 / 185 | 7 / 168 | 4 / 157 |
| Question 15 (no only) | 149 / 1676 | 75 / 959 | 24 / 207 | 25 / 185 | 11 / 168 | 14 / 157 |
| Question 16 (no only) | 167 / 1676 | 97 / 959 | 17 / 207 | 18 / 185 | 19 / 168 | 16 / 157 |
| Question 17 (no only) | 305 / 1676 | 151 / 959 | 42 / 207 | 42 / 185 | 43 / 168 | 27 / 157 |
| Question 18 (no only) | 175 / 1676 | 102 / 959 | 13 / 207 | 19 / 185 | 30 / 168 | 11 / 157 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Question 19 (no only) | 225 / 1676 | 117 / 959 | 28 / 207 | 33 / 185 | 27 / 168 | 20 / 157 |
| Question 20 (no or not applicable) | 265 / 1676 | 156 / 959 | 24 / 207 | 49 / 185 | 16 / 168 | 20 / 157 |
| Question 29 (no or not applicable) | 882 / 1676 | 464 / 959 | 120 / 207 | 92 / 185 | 110 / 168 | 96 / 157 |
| **Surveyed items that did not meet all of the above survey questions** | 15 / 1676 | 11 / 959 | 0 / 207 | 2 / 185 | 0 / 168 | 2 / 157 |
| **Surveyed items that did not meet one or more of the above survey questions** | 1552 / 1676 | 856 / 959 | 204 / 207 | 181 / 185 | 163 / 168 | 148 / 157 |

*Software Appendix B*[1]

## Question-by-Question Responses to the Software Accessibility Checklist: Statistics by Agency Size

**Question 1**: Does the software provide keyboard equivalents for all mouse actions, including buttons, scroll windows, text entry fields, and pop-up windows?

| **Type of Agency** | **Yes** | **No** | **Not Applicable** | **Total** |
|---|---|---|---|---|
| Overall (All Agencies) | 1275 (76.1%) | 221 (13.2%) | 180 (10.7%) | 1676 |
| Cabinet Level Agencies | 724 (75.5%) | 129 (13.5%) | 106 (11.1%) | 959 |
| All Large Agencies | 165 (79.7%) | 19 (9.2%) | 23 (11.1%) | 207 |
| All Medium Agencies | 125 (67.6%) | 34 (18.4%) | 26 (14.1%) | 185 |
| All Small Agencies | 143 (85.1%) | 16 (9.5%) | 9 (5.4%) | 168 |
| All Very Small Agencies | 118 (75.2%) | 23 (14.6%) | 16 (10.2%) | 157 |

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[1] This document is available on the Department of Justice's section 508 Web site (www.usdoj.gov/crt/508). People with disabilities may request copies in Braille, large print, or on computer disk by calling 1-800-514-0301 (voice) or 1-800-514-0383 (TTY).

| **Question 2**: Does the program provide clear and precise instructions for use of all keyboard functions as part of the user documentation? | | | | |
|---|---|---|---|---|
| **Type of Agency** | **Yes** | **No** | **Not Applicable** | **Total** |
| Overall (All Agencies) | 1248 (74.5%) | 294 (17.5%) | 134 (8%) | 1676 |
| Cabinet Level Agencies | 709 (73.9%) | 158 (16.5%) | 92 (9.6%) | 959 |
| All Large Agencies | 159 (76.8%) | 40 (19.3%) | 8 (3.9%) | 207 |
| All Medium Agencies | 131 (70.8%) | 43 (23.2%) | 11 (5.9%) | 185 |
| All Small Agencies | 129 (76.8%) | 34 (20.2%) | 5 (3%) | 168 |
| All Very Small Agencies | 120 (76.4%) | 19 (12.1%) | 18 (11.5%) | 157 |

| **Question 3**: Are instructions regarding keyboard use widely available for all users in your component? | | | | |
|---|---|---|---|---|
| **Type of Agency** | **Yes** | **No** | **Not Applicable** | **Total** |
| Overall (All Agencies) | 1180 (70.4%) | 353 (21.1%) | 143 (8.5%) | 1676 |
| Cabinet Level Agencies | 649 (67.7%) | 222 (23.1%) | 88 (9.2%) | 959 |
| All Large Agencies | 164 (79.2%) | 34 (16.4%) | 9 (4.3%) | 207 |
| All Medium Agencies | 133 (71.9%) | 40 (21.6%) | 12 (6.5%) | 185 |
| All Small Agencies | 125 (74.4%) | 38 (22.6%) | 5 (3%) | 168 |
| All Very Small Agencies | 109 (69.4%) | 19 (12.1%) | 29 (18.5%) | 157 |

**Question 4**: Does the software have a logical tabbing order among fields, text boxes, and focal points?

| **Type of Agency** | **Yes** | **No** | **Not Applicable** | **Total** |
|---|---|---|---|---|
| Overall (All Agencies) | 1444 (86.2%) | 84 (5%) | 148 (8.8%) | 1676 |
| Cabinet Level Agencies | 816 (85.1%) | 53 (5.5%) | 90 (9.4%) | 959 |
| All Large Agencies | 188 (90.8%) | 10 (4.8%) | 9 (4.3%) | 207 |
| All Medium Agencies | 154 (83.2%) | 8 (4.3%) | 23 (12.4%) | 185 |
| All Small Agencies | 157 (93.5%) | 5 (3%) | 6 (3.6%) | 168 |
| All Very Small Agencies | 129 (82.2%) | 8 (5.1%) | 20 (12.7%) | 157 |

**Question 5**: When navigating screens and dialog boxes using the keyboard, does the focus follow a logical tabbing order?

| **Type of Agency** | **Yes** | **No** | **Not Applicable** | **Total** |
|---|---|---|---|---|
| Overall (All Agencies) | 1443 (86.1%) | 85 (5.1%) | 148 (8.8%) | 1676 |
| Cabinet Level Agencies | 811 (84.6%) | 55 (5.7%) | 93 (9.7%) | 959 |
| All Large Agencies | 191 (92.3%) | 7 (3.4%) | 9 (4.3%) | 207 |
| All Medium Agencies | 150 (81.1%) | 12 (6.5%) | 23 (12.4%) | 185 |
| All Small Agencies | 158 (94%) | 5 (3%) | 5 (3%) | 168 |
| All Very Small Agencies | 133 (84.7%) | 6 (3.8%) | 18 (11.5%) | 157 |

**Question 6**: Is there a well-defined focal point that moves with keyboard navigation? (E.g., can you use the arrow keys to navigate through a list followed by pressing the ENTER key or space bar to select the desired item?)

| **Type of Agency** | **Yes** | **No** | **Not Applicable** | **Total** |
|---|---|---|---|---|
| Overall (All Agencies) | 1376 (82.1%) | 142 (8.5%) | 158 (9.4%) | 1676 |
| Cabinet Level Agencies | 776 (80.9%) | 86 (9%) | 97 (10.1%) | 959 |
| All Large Agencies | 177 (85.5%) | 15 (7.2%) | 15 (7.2%) | 207 |
| All Medium Agencies | 141 (76.2%) | 13 (7%) | 31 (16.8%) | 185 |
| All Small Agencies | 155 (92.3%) | 13 (7.7%) | 0 (0%) | 168 |
| All Very Small Agencies | 127 (80.9%) | 15 (9.6%) | 15 (9.6%) | 157 |

**Question 7**: Are shortcut keys provided for all pull-down menus?

| **Type of Agency** | **Yes** | **No** | **Not Applicable** | **Total** |
|---|---|---|---|---|
| Overall (All Agencies) | 1058 (63.1%) | 374 (22.3%) | 244 (14.6%) | 1676 |
| Cabinet Level Agencies | 603 (62.9%) | 213 (22.2%) | 143 (14.9%) | 959 |
| All Large Agencies | 84 (40.6%) | 91 (44%) | 32 (15.5%) | 207 |
| All Medium Agencies | 118 (63.8%) | 36 (19.5%) | 31 (16.8%) | 185 |
| All Small Agencies | 135 (80.4%) | 22 (13.1%) | 11 (6.5%) | 168 |
| All Very Small Agencies | 118 (75.2%) | 12 (7.6%) | 27 (17.2%) | 157 |

**Question 8**: Does the software support existing accessibility features built into the operating system (e.g., sticky keys, slow keys, repeat keys in Apple Macintosh OS or Microsoft Windows 95)?

| **Type of Agency** | **Yes** | **No** | **Not Applicable** | **Total** |
|---|---|---|---|---|
| Overall (All Agencies) | 1143 (68.2%) | 236 (14.1%) | 297 (17.7%) | 1676 |
| Cabinet Level Agencies | 610 (63.6%) | 160 (16.7%) | 189 (19.7%) | 959 |
| All Large Agencies | 157 (75.8%) | 18 (8.7%) | 32 (15.5%) | 207 |
| All Medium Agencies | 123 (66.5%) | 27 (14.6%) | 35 (18.9%) | 185 |
| All Small Agencies | 131 (78%) | 21 (12.5%) | 16 (9.5%) | 168 |
| All Very Small Agencies | 122 (77.7%) | 10 (6.4%) | 25 (15.9%) | 157 |

**Question 9**: If timed responses are present, does the software allow the user to modify the timing parameters of any required timed responses?

| **Type of Agency** | **Yes** | **No** | **Not Applicable** | **Total** |
|---|---|---|---|---|
| Overall (All Agencies) | 293 (17.5%) | 185 (11%) | 1198 (71.5%) | 1676 |
| Cabinet Level Agencies | 190 (19.8%) | 107 (11.2%) | 662 (69%) | 959 |
| All Large Agencies | 15 (7.2%) | 27 (13%) | 165 (79.7%) | 207 |
| All Medium Agencies | 20 (10.8%) | 36 (19.5%) | 129 (69.7%) | 185 |
| All Small Agencies | 44 (26.2%) | 10 (6%) | 114 (67.9%) | 168 |
| All Very Small Agencies | 24 (15.3%) | 5 (3.2%) | 128 (81.5%) | 157 |

**Question 10**: Are all descriptions or labels for fields positioned immediately to the left or directly above the control, and do they end in a colon, so that it is easy for screen reading software to associate the labels with the corresponding fields?

| **Type of Agency** | **Yes** | **No** | **Not Applicable** | **Total** |
|---|---|---|---|---|
| Overall (All Agencies) | 888 (53%) | 402 (24%) | 386 (23%) | 1676 |
| Cabinet Level Agencies | 500 (52.1%) | 208 (21.7%) | 251 (26.2%) | 959 |
| All Large Agencies | 113 (54.6%) | 75 (36.2%) | 19 (9.2%) | 207 |
| All Medium Agencies | 82 (44.3%) | 51 (27.6%) | 52 (28.1%) | 185 |
| All Small Agencies | 92 (54.8%) | 40 (23.8%) | 36 (21.4%) | 168 |
| All Very Small Agencies | 101 (64.3%) | 28 (17.8%) | 28 (17.8%) | 157 |

**Question 11**: Does every window, object, and control have a clearly named label?

| **Type of Agency** | **Yes** | **No** | **Not Applicable** | **Total** |
|---|---|---|---|---|
| Overall (All Agencies) | 1372 (81.9%) | 139 (8.3%) | 165 (9.8%) | 1676 |
| Cabinet Level Agencies | 781 (81.4%) | 77 (8%) | 101 (10.5%) | 959 |
| All Large Agencies | 171 (82.6%) | 15 (7.2%) | 21 (10.1%) | 207 |
| All Medium Agencies | 148 (80%) | 14 (7.6%) | 23 (12.4%) | 185 |
| All Small Agencies | 139 (82.7%) | 22 (13.1%) | 7 (4.2%) | 168 |
| All Very Small Agencies | 133 (84.7%) | 11 (7%) | 13 (8.3%) | 157 |

**Question 12**: Does the software application use standard controls rather than owner-drawn or custom controls?

| Type of Agency | Yes | No | Not Applicable | Total |
|---|---|---|---|---|
| Overall (All Agencies) | 1427 (85.1%) | 129 (7.7%) | 120 (7.2%) | 1676 |
| Cabinet Level Agencies | 801 (83.5%) | 73 (7.6%) | 85 (8.9%) | 959 |
| All Large Agencies | 182 (87.9%) | 16 (7.7%) | 9 (4.3%) | 207 |
| All Medium Agencies | 157 (84.9%) | 13 (7%) | 15 (8.1%) | 185 |
| All Small Agencies | 153 (91.1%) | 14 (8.3%) | 1 (0.6%) | 168 |
| All Very Small Agencies | 134 (85.4%) | 13 (8.3%) | 10 (6.4%) | 157 |

**Question 13**: Does the software have a user selectable option to display text on icons., i.e., text only icons or bubble help?

| Type of Agency | Yes | No | Not Applicable | Total |
|---|---|---|---|---|
| Overall (All Agencies) | 1002 (59.8%) | 296 (17.7%) | 378 (22.6%) | 1676 |
| Cabinet Level Agencies | 555 (57.9%) | 160 (16.7%) | 244 (25.4%) | 959 |
| All Large Agencies | 125 (60.4%) | 41 (19.8%) | 41 (19.8%) | 207 |
| All Medium Agencies | 111 (60%) | 37 (20%) | 37 (20%) | 185 |
| All Small Agencies | 110 (65.5%) | 29 (17.3%) | 29 (17.3%) | 168 |
| All Very Small Agencies | 101 (64.3%) | 29 (18.5%) | 27 (17.2%) | 157 |

| **Question 14**: Is the use of icons consistent throughout the application? | | | | |
|---|---|---|---|---|
| **Type of Agency** | **Yes** | **No** | **Not Applicable** | **Total** |
| Overall (All Agencies) | 1286 (76.7%) | 76 (4.5%) | 314 (18.7%) | 1676 |
| Cabinet Level Agencies | 712 (74.2%) | 49 (5.1%) | 198 (20.6%) | 959 |
| All Large Agencies | 157 (75.8%) | 6 (2.9%) | 44 (21.3%) | 207 |
| All Medium Agencies | 142 (76.8%) | 10 (5.4%) | 33 (17.8%) | 185 |
| All Small Agencies | 140 (83.3%) | 7 (4.2%) | 21 (12.5%) | 168 |
| All Very Small Agencies | 135 (86%) | 4 (2.5%) | 18 (11.5%) | 157 |

| **Question 15**: Are menus with text equivalents provided for all icon functions or icon selections on menu, tool, and format bars? | | | | |
|---|---|---|---|---|
| **Type of Agency** | **Yes** | **No** | **Not Applicable** | **Total** |
| Overall (All Agencies) | 1193 (71.2%) | 149 (8.9%) | 334 (19.9%) | 1676 |
| Cabinet Level Agencies | 673 (70.2%) | 75 (7.8%) | 211 (22%) | 959 |
| All Large Agencies | 140 (67.6%) | 24 (11.6%) | 43 (20.8%) | 207 |
| All Medium Agencies | 126 (68.1%) | 25 (13.5%) | 34 (18.4%) | 185 |
| All Small Agencies | 131 (78%) | 11 (6.5%) | 26 (15.5%) | 168 |
| All Very Small Agencies | 123 (78.3%) | 14 (8.9%) | 20 (12.7%) | 157 |

**Question 16**: If there are audio alerts, are visual cues also provided?

| **Type of Agency** | **Yes** | **No** | **Not Applicable** | **Total** |
|---|---|---|---|---|
| Overall (All Agencies) | 802 (47.9%) | 167 (10%) | 707 (42.2%) | 1676 |
| Cabinet Level Agencies | 443 (46.2%) | 97 (10.1%) | 419 (43.7%) | 959 |
| All Large Agencies | 113 (54.6%) | 17 (8.2%) | 77 (37.2%) | 207 |
| All Medium Agencies | 95 (51.4%) | 18 (9.7%) | 72 (38.9%) | 185 |
| All Small Agencies | 91 (54.2%) | 19 (11.3%) | 58 (34.5%) | 168 |
| All Very Small Agencies | 60 (38.2%) | 16 (10.2%) | 81 (51.6%) | 157 |

**Question 17**: Does the software support the "show sounds" feature where it is built into the operating system?

| **Type of Agency** | **Yes** | **No** | **Not Applicable** | **Total** |
|---|---|---|---|---|
| Overall (All Agencies) | 743 (44.3%) | 305 (18.2%) | 628 (37.5%) | 1676 |
| Cabinet Level Agencies | 442 (46.1%) | 151 (15.7%) | 366 (38.2%) | 959 |
| All Large Agencies | 100 (48.3%) | 42 (20.3%) | 65 (31.4%) | 207 |
| All Medium Agencies | 78 (42.2%) | 42 (22.7%) | 65 (35.1%) | 185 |
| All Small Agencies | 65 (38.7%) | 43 (25.6%) | 60 (35.7%) | 168 |
| All Very Small Agencies | 58 (36.9%) | 27 (17.2%) | 72 (45.9%) | 157 |

| **Question 18**: Can the user disable or adjust sound volume? | | | | |
|---|---|---|---|---|
| **Type of Agency** | **Yes** | **No** | **Not Applicable** | **Total** |
| Overall (All Agencies) | 936 (55.8%) | 175 (10.4%) | 565 (33.7%) | 1676 |
| Cabinet Level Agencies | 545 (56.8%) | 102 (10.6%) | 312 (32.5%) | 959 |
| All Large Agencies | 120 (58%) | 13 (6.3%) | 74 (35.7%) | 207 |
| All Medium Agencies | 98 (53%) | 19 (10.3%) | 68 (36.8%) | 185 |
| All Small Agencies | 78 (46.4%) | 30 (17.9%) | 60 (35.7%) | 168 |
| All Very Small Agencies | 95 (60.5%) | 11 (7%) | 51 (32.5%) | 157 |

| **Question 19**: If information is provided in an audio format, is it also capable of being displayed by the user in a visual format? | | | | |
|---|---|---|---|---|
| **Type of Agency** | **Yes** | **No** | **Not Applicable** | **Total** |
| Overall (All Agencies) | 455 (27.1%) | 225 (13.4%) | 996 (59.4%) | 1676 |
| Cabinet Level Agencies | 304 (31.7%) | 117 (12.2%) | 538 (56.1%) | 959 |
| All Large Agencies | 26 (12.6%) | 28 (13.5%) | 153 (73.9%) | 207 |
| All Medium Agencies | 40 (21.6%) | 33 (17.8%) | 112 (60.5%) | 185 |
| All Small Agencies | 46 (27.4%) | 27 (16.1%) | 95 (56.5%) | 168 |
| All Very Small Agencies | 39 (24.8%) | 20 (12.7%) | 98 (62.4%) | 157 |

| **Question 20**: Is the software application free of patterned backgrounds used behind text or important graphics? | | | | |
|---|---|---|---|---|
| **Type of Agency** | **Yes** | **No** | **Not Applicable** | **Total** |
| Overall (All Agencies) | 1411 (84.2%) | 112 (6.7%) | 153 (9.1%) | 1676 |
| Cabinet Level Agencies | 803 (83.7%) | 68 (7.1%) | 88 (9.2%) | 959 |
| All Large Agencies | 183 (88.4%) | 10 (4.8%) | 14 (6.8%) | 207 |
| All Medium Agencies | 136 (73.5%) | 15 (8.1%) | 34 (18.4%) | 185 |
| All Small Agencies | 152 (90.5%) | 10 (6%) | 6 (3.6%) | 168 |
| All Very Small Agencies | 137 (87.3%) | 9 (5.7%) | 11 (7%) | 157 |

| **Question 21**: Can the user override default fonts for printing and text displays? | | | | |
|---|---|---|---|---|
| **Type of Agency** | **Yes** | **No** | **Not Applicable** | **Total** |
| Overall (All Agencies) | 1204 (71.8%) | 345 (20.6%) | 127 (7.6%) | 1676 |
| Cabinet Level Agencies | 688 (71.7%) | 187 (19.5%) | 84 (8.8%) | 959 |
| All Large Agencies | 139 (67.1%) | 61 (29.5%) | 7 (3.4%) | 207 |
| All Medium Agencies | 130 (70.3%) | 40 (21.6%) | 15 (8.1%) | 185 |
| All Small Agencies | 127 (75.6%) | 35 (20.8%) | 6 (3.6%) | 168 |
| All Very Small Agencies | 120 (76.4%) | 22 (14%) | 15 (9.6%) | 157 |

| **Question 22**: Can a user adjust or disable flashing, rotating, or moving displays? | | | | |
|---|---|---|---|---|
| **Type of Agency** | **Yes** | **No** | **Not Applicable** | **Total** |
| Overall (All Agencies) | 611 (36.5%) | 240 (14.3%) | 825 (49.2%) | 1676 |
| Cabinet Level Agencies | 386 (40.3%) | 126 (13.1%) | 447 (46.6%) | 959 |
| All Large Agencies | 73 (35.3%) | 36 (17.4%) | 98 (47.3%) | 207 |
| All Medium Agencies | 52 (28.1%) | 28 (15.1%) | 105 (56.8%) | 185 |
| All Small Agencies | 54 (32.1%) | 33 (19.6%) | 81 (48.2%) | 168 |
| All Very Small Agencies | 46 (29.3%) | 17 (10.8%) | 94 (59.9%) | 157 |

| **Question 23**: Does the software ensure that color-coding is never used as the only means of conveying information or indicating an action? | | | | |
|---|---|---|---|---|
| **Type of Agency** | **Yes** | **No** | **Not Applicable** | **Total** |
| Overall (All Agencies) | 1150 (68.6%) | 220 (13.1%) | 306 (18.3%) | 1676 |
| Cabinet Level Agencies | 646 (67.4%) | 122 (12.7%) | 191 (19.9%) | 959 |
| All Large Agencies | 163 (78.7%) | 25 (12.1%) | 19 (9.2%) | 207 |
| All Medium Agencies | 116 (62.7%) | 49 (26.5%) | 20 (10.8%) | 185 |
| All Small Agencies | 123 (73.2%) | 13 (7.7%) | 32 (19%) | 168 |
| All Very Small Agencies | 102 (65%) | 11 (7%) | 44 (28%) | 157 |

| **Question 24**: Does the application support user-defined color settings system-wide? | | | | |
|---|---|---|---|---|
| **Type of Agency** | **Yes** | **No** | **Not Applicable** | **Total** |
| Overall (All Agencies) | 1174 (70%) | 294 (17.5%) | 208 (12.4%) | 1676 |
| Cabinet Level Agencies | 682 (71.1%) | 147 (15.3%) | 130 (13.6%) | 959 |
| All Large Agencies | 136 (65.7%) | 52 (25.1%) | 19 (9.2%) | 207 |
| All Medium Agencies | 110 (59.5%) | 51 (27.6%) | 24 (13%) | 185 |
| All Small Agencies | 141 (83.9%) | 22 (13.1%) | 5 (3%) | 168 |
| All Very Small Agencies | 105 (66.9%) | 22 (14%) | 30 (19.1%) | 157 |

| **Question 25**: Is highlighting also viewable with inverted colors? | | | | |
|---|---|---|---|---|
| **Type of Agency** | **Yes** | **No** | **Not Applicable** | **Total** |
| Overall (All Agencies) | 1155 (68.9%) | 260 (15.5%) | 261 (15.6%) | 1676 |
| Cabinet Level Agencies | 675 (70.4%) | 134 (14%) | 150 (15.6%) | 959 |
| All Large Agencies | 128 (61.8%) | 54 (26.1%) | 25 (12.1%) | 207 |
| All Medium Agencies | 116 (62.7%) | 39 (21.1%) | 30 (16.2%) | 185 |
| All Small Agencies | 130 (77.4%) | 8 (4.8%) | 30 (17.9%) | 168 |
| All Very Small Agencies | 106 (67.5%) | 25 (15.9%) | 26 (16.6%) | 157 |

**Question 26**: If the software application draws its own screen elements, does it pick up the size settings that the user has selected in the Control Panel?

| **Type of Agency** | **Yes** | **No** | **Not Applicable** | **Total** |
|---|---|---|---|---|
| Overall (All Agencies) | 972 (58%) | 247 (14.7%) | 457 (27.3%) | 1676 |
| Cabinet Level Agencies | 566 (59%) | 136 (14.2%) | 257 (26.8%) | 959 |
| All Large Agencies | 112 (54.1%) | 35 (16.9%) | 60 (29%) | 207 |
| All Medium Agencies | 92 (49.7%) | 25 (13.5%) | 68 (36.8%) | 185 |
| All Small Agencies | 111 (66.1%) | 33 (19.6%) | 24 (14.3%) | 168 |
| All Very Small Agencies | 91 (58%) | 18 (11.5%) | 48 (30.6%) | 157 |

**Question 27**: Are all manuals and documentation provided in electronic format as well as ASCII text files, including text descriptions of any charts, graphs, pictures, or graphics of any nature?

| **Type of Agency** | **Yes** | **No** | **Not Applicable** | **Total** |
|---|---|---|---|---|
| Overall (All Agencies) | 896 (53.5%) | 612 (36.5%) | 168 (10%) | 1676 |
| Cabinet Level Agencies | 513 (53.5%) | 354 (36.9%) | 92 (9.6%) | 959 |
| All Large Agencies | 97 (46.9%) | 93 (44.9%) | 17 (8.2%) | 207 |
| All Medium Agencies | 100 (54.1%) | 67 (36.2%) | 18 (9.7%) | 185 |
| All Small Agencies | 93 (55.4%) | 52 (31%) | 23 (13.7%) | 168 |
| All Very Small Agencies | 93 (59.2%) | 46 (29.3%) | 18 (11.5%) | 157 |

**Question 28**: Can a user choose to have any report generated by the software made available in a "print to ASCII file" format?

| **Type of Agency** | **Yes** | **No** | **Not Applicable** | **Total** |
|---|---|---|---|---|
| Overall (All Agencies) | 989 (59%) | 430 (25.7%) | 257 (15.3%) | 1676 |
| Cabinet Level Agencies | 541 (56.4%) | 270 (28.2%) | 148 (15.4%) | 959 |
| All Large Agencies | 129 (62.3%) | 62 (30%) | 16 (7.7%) | 207 |
| All Medium Agencies | 96 (51.9%) | 44 (23.8%) | 45 (24.3%) | 185 |
| All Small Agencies | 113 (67.3%) | 33 (19.6%) | 22 (13.1%) | 168 |
| All Very Small Agencies | 110 (70.1%) | 21 (13.4%) | 26 (16.6%) | 157 |

**Question 29**: Is special training provided for users with disabilities that will enable them to become familiar with the software and learn how to use it in conjunction with assistive technology provided as an accommodation?

| **Type of Agency** | **Yes** | **No** | **Not Applicable** | **Total** |
|---|---|---|---|---|
| Overall (All Agencies) | 794 (47.4%) | 560 (33.4%) | 322 (19.2%) | 1676 |
| Cabinet Level Agencies | 495 (51.6%) | 311 (32.4%) | 153 (16%) | 959 |
| All Large Agencies | 87 (42%) | 101 (48.8%) | 19 (9.2%) | 207 |
| All Medium Agencies | 93 (50.3%) | 64 (34.6%) | 28 (15.1%) | 185 |
| All Small Agencies | 58 (34.5%) | 58 (34.5%) | 52 (31%) | 168 |
| All Very Small Agencies | 61 (38.9%) | 26 (16.6%) | 70 (44.6%) | 157 |

*Software Appendix C*[1]

## Question-by-Question Responses to the Software Accessibility Checklist: Statistics by Type of Software

**Question 1**: Does the software provide keyboard equivalents for all mouse actions, including buttons, scroll windows, text entry fields, and pop-up windows?

| Type of Software | Yes | No | Not Applicable |
|---|---|---|---|
| Online database access | 114 / 170 (67.1%) | 30 / 170 (17.6%) | 26 / 170 (15.3%) |
| spreadsheet | 124 / 146 (84.9%) | 16 / 146 (11%) | 6 / 146 (4.1%) |
| word processor | 171 / 201 (85.1%) | 19 / 201 (9.5%) | 11 / 201 (5.5%) |
| e-mail | 137 / 159 (86.2%) | 14 / 159 (8.8%) | 8 / 159 (5%) |
| Other | 342 / 478 (71.5%) | 67 / 478 (14%) | 69 / 478 (14.4%) |
| database | 201 / 301 (66.8%) | 53 / 301 (17.6%) | 47 / 301 (15.6%) |
| Internet browser | 137 / 156 (87.8%) | 13 / 156 (8.3%) | 6 / 156 (3.8%) |
| groupware | 38 / 47 (80.9%) | 3 / 47 (6.4%) | 6 / 47 (12.8%) |
| Other Internet access | 11 / 18 (61.1%) | 6 / 18 (33.3%) | 1 / 18 (5.6%) |

**Question 2**: Does the program provide clear and precise instructions for use of all keyboard functions as part of the user documentation?

| Type of Software | Yes | No | Not Applicable |
|---|---|---|---|
| Online database access | 112 / 170 (65.9%) | 52 / 170 (30.6%) | 6 / 170 (3.5%) |
| spreadsheet | 120 / 146 (82.2%) | 17 / 146 (11.6%) | 9 / 146 (6.2%) |
| word processor | 173 / 201 (86.1%) | 17 / 201 (8.5%) | 11 / 201 (5.5%) |
| e-mail | 130 / 159 (81.8%) | 21 / 159 (13.2%) | 8 / 159 (5%) |
| Other | 337 / 478 (70.5%) | 86 / 478 (18%) | 55 / 478 (11.5%) |
| database | 210 / 301 (69.8%) | 63 / 301 (20.9%) | 28 / 301 (9.3%) |
| Internet browser | 119 / 156 (76.3%) | 26 / 156 (16.7%) | 11 / 156 (7.1%) |
| groupware | 35 / 47 (74.5%) | 8 / 47 (17%) | 4 / 47 (8.5%) |
| Other Internet access | 12 / 18 (66.7%) | 4 / 18 (22.2%) | 2 / 18 (11.1%) |

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[1] This document is available on the Department of Justice's section 508 Web site (www.usdoj.gov/crt/508). People with disabilities may request copies in Braille, large print, or on computer disk by calling 1-800-514-0301 (voice) or 1-800-514-0383 (TTY).

**Question 3**: Are instructions regarding keyboard use widely available for all users in your component?

| **Type of Software** | **Yes** | **No** | **Not Applicable** |
|---|---|---|---|
| Online database access | 117 / 170 (68.8%) | 47 / 170 (27.6%) | 6 / 170 (3.5%) |
| spreadsheet | 110 / 146 (75.3%) | 26 / 146 (17.8%) | 10 / 146 (6.8%) |
| word processor | 160 / 201 (79.6%) | 28 / 201 (13.9%) | 13 / 201 (6.5%) |
| e-mail | 120 / 159 (75.5%) | 32 / 159 (20.1%) | 7 / 159 (4.4%) |
| Other | 337 / 478 (70.5%) | 83 / 478 (17.4%) | 58 / 478 (12.1%) |
| database | 196 / 301 (65.1%) | 77 / 301 (25.6%) | 28 / 301 (9.3%) |
| Internet browser | 95 / 156 (60.9%) | 47 / 156 (30.1%) | 14 / 156 (9%) |
| groupware | 35 / 47 (74.5%) | 8 / 47 (17%) | 4 / 47 (8.5%) |
| Other Internet access | 10 / 18 (55.6%) | 5 / 18 (27.8%) | 3 / 18 (16.7%) |

**Question 4**: Does the software have a logical tabbing order among fields, text boxes, and focal points?

| **Type of Software** | **Yes** | **No** | **Not Applicable** |
|---|---|---|---|
| Online database access | 155 / 170 (91.2%) | 6 / 170 (3.5%) | 9 / 170 (5.3%) |
| spreadsheet | 134 / 146 (91.8%) | 2 / 146 (1.4%) | 10 / 146 (6.8%) |
| word processor | 176 / 201 (87.6%) | 7 / 201 (3.5%) | 18 / 201 (9%) |
| e-mail | 137 / 159 (86.2%) | 10 / 159 (6.3%) | 12 / 159 (7.5%) |
| Other | 396 / 478 (82.8%) | 33 / 478 (6.9%) | 49 / 478 (10.3%) |
| database | 263 / 301 (87.4%) | 10 / 301 (3.3%) | 28 / 301 (9.3%) |
| Internet browser | 128 / 156 (82.1%) | 14 / 156 (9%) | 14 / 156 (9%) |
| groupware | 42 / 47 (89.4%) | 1 / 47 (2.1%) | 4 / 47 (8.5%) |
| Other Internet access | 13 / 18 (72.2%) | 1 / 18 (5.6%) | 4 / 18 (22.2%) |

| **Question 5**: When navigating screens and dialog boxes using the keyboard, does the focus follow a logical tabbing order? | | | |
|---|---|---|---|
| **Type of Software** | **Yes** | **No** | **Not Applicable** |
| Online database access | 150 / 170 (88.2%) | 10 / 170 (5.9%) | 10 / 170 (5.9%) |
| spreadsheet | 136 / 146 (93.2%) | 2 / 146 (1.4%) | 8 / 146 (5.5%) |
| word processor | 181 / 201 (90%) | 6 / 201 (3%) | 14 / 201 (7%) |
| e-mail | 141 / 159 (88.7%) | 9 / 159 (5.7%) | 9 / 159 (5.7%) |
| Other | 393 / 478 (82.2%) | 29 / 478 (6.1%) | 56 / 478 (11.7%) |
| database | 254 / 301 (84.4%) | 18 / 301 (6%) | 29 / 301 (9.6%) |
| Internet browser | 134 / 156 (85.9%) | 8 / 156 (5.1%) | 14 / 156 (9%) |
| groupware | 40 / 47 (85.1%) | 3 / 47 (6.4%) | 4 / 47 (8.5%) |
| Other Internet access | 14 / 18 (77.8%) | 0 / 18 (0%) | 4 / 18 (22.2%) |

| **Question 6**: Is there a well-defined focal point that moves with keyboard navigation? (E.g., can you use the arrow keys to navigate through a list followed by pressing the ENTER key or space bar to select the desired item?) | | | |
|---|---|---|---|
| **Type of Software** | **Yes** | **No** | **Not Applicable** |
| Online database access | 135 / 170 (79.4%) | 18 / 170 (10.6%) | 17 / 170 (10%) |
| spreadsheet | 133 / 146 (91.1%) | 3 / 146 (2.1%) | 10 / 146 (6.8%) |
| word processor | 179 / 201 (89.1%) | 9 / 201 (4.5%) | 13 / 201 (6.5%) |
| e-mail | 144 / 159 (90.6%) | 8 / 159 (5%) | 7 / 159 (4.4%) |
| Other | 365 / 478 (76.4%) | 54 / 478 (11.3%) | 59 / 478 (12.3%) |
| database | 236 / 301 (78.4%) | 34 / 301 (11.3%) | 31 / 301 (10.3%) |
| Internet browser | 132 / 156 (84.6%) | 12 / 156 (7.7%) | 12 / 156 (7.7%) |
| groupware | 39 / 47 (83%) | 4 / 47 (8.5%) | 4 / 47 (8.5%) |
| Other Internet access | 13 / 18 (72.2%) | 0 / 18 (0%) | 5 / 18 (27.8%) |

**Question 7**: Are shortcut keys provided for all pull-down menus?

| **Type of Software** | **Yes** | **No** | **Not Applicable** |
|---|---|---|---|
| Online database access | 90 / 170 (52.9%) | 32 / 170 (18.8%) | 48 / 170 (28.2%) |
| spreadsheet | 101 / 146 (69.2%) | 38 / 146 (26%) | 7 / 146 (4.8%) |
| word processor | 146 / 201 (72.6%) | 43 / 201 (21.4%) | 12 / 201 (6%) |
| e-mail | 112 / 159 (70.4%) | 37 / 159 (23.3%) | 10 / 159 (6.3%) |
| Other | 289 / 478 (60.5%) | 104 / 478 (21.8%) | 85 / 478 (17.8%) |
| database | 167 / 301 (55.5%) | 70 / 301 (23.3%) | 64 / 301 (21.3%) |
| Internet browser | 108 / 156 (69.2%) | 39 / 156 (25%) | 9 / 156 (5.8%) |
| groupware | 35 / 47 (74.5%) | 6 / 47 (12.8%) | 6 / 47 (12.8%) |
| Other Internet access | 10 / 18 (55.6%) | 5 / 18 (27.8%) | 3 / 18 (16.7%) |

**Question 8**: Does the software support existing accessibility features built into the operating system (e.g., sticky keys, slow keys, repeat keys in Apple Macintosh OS or Microsoft Windows 95)?

| **Type of Software** | **Yes** | **No** | **Not Applicable** |
|---|---|---|---|
| Online database access | 84 / 170 (49.4%) | 38 / 170 (22.4%) | 48 / 170 (28.2%) |
| spreadsheet | 118 / 146 (80.8%) | 11 / 146 (7.5%) | 17 / 146 (11.6%) |
| word processor | 167 / 201 (83.1%) | 15 / 201 (7.5%) | 19 / 201 (9.5%) |
| e-mail | 124 / 159 (78%) | 16 / 159 (10.1%) | 19 / 159 (11.9%) |
| Other | 296 / 478 (61.9%) | 73 / 478 (15.3%) | 109 / 478 (22.8%) |
| database | 177 / 301 (58.8%) | 67 / 301 (22.3%) | 57 / 301 (18.9%) |
| Internet browser | 129 / 156 (82.7%) | 12 / 156 (7.7%) | 15 / 156 (9.6%) |
| groupware | 35 / 47 (74.5%) | 2 / 47 (4.3%) | 10 / 47 (21.3%) |
| Other Internet access | 13 / 18 (72.2%) | 2 / 18 (11.1%) | 3 / 18 (16.7%) |

| **Question 9**: If timed responses are present, does the software allow the user to modify the timing parameters of any required timed responses? | | | |
|---|---|---|---|
| **Type of Software** | **Yes** | **No** | **Not Applicable** |
| Online database access | 20 / 170 (11.8%) | 23 / 170 (13.5%) | 127 / 170 (74.7%) |
| spreadsheet | 24 / 146 (16.4%) | 15 / 146 (10.3%) | 107 / 146 (73.3%) |
| word processor | 36 / 201 (17.9%) | 18 / 201 (9%) | 147 / 201 (73.1%) |
| e-mail | 43 / 159 (27%) | 13 / 159 (8.2%) | 103 / 159 (64.8%) |
| Other | 96 / 478 (20.1%) | 64 / 478 (13.4%) | 318 / 478 (66.5%) |
| database | 35 / 301 (11.6%) | 33 / 301 (11%) | 233 / 301 (77.4%) |
| Internet browser | 29 / 156 (18.6%) | 17 / 156 (10.9%) | 110 / 156 (70.5%) |
| groupware | 7 / 47 (14.9%) | 1 / 47 (2.1%) | 39 / 47 (83%) |
| Other Internet access | 3 / 18 (16.7%) | 1 / 18 (5.6%) | 14 / 18 (77.8%) |

| **Question 10**: Are all descriptions or labels for field positioned immediately to the left or directly above the control, and do they end in a colon, so that it is easy for screen reading software to associate the labels with the corresponding fields? | | | |
|---|---|---|---|
| **Type of Software** | **Yes** | **No** | **Not Applicable** |
| Online database access | 86 / 170 (50.6%) | 75 / 170 (44.1%) | 9 / 170 (5.3%) |
| spreadsheet | 77 / 146 (52.7%) | 22 / 146 (15.1%) | 47 / 146 (32.2%) |
| word processor | 107 / 201 (53.2%) | 33 / 201 (16.4%) | 61 / 201 (30.3%) |
| e-mail | 88 / 159 (55.3%) | 31 / 159 (19.5%) | 40 / 159 (25.2%) |
| Other | 251 / 478 (52.5%) | 112 / 478 (23.4%) | 115 / 478 (24.1%) |
| database | 169 / 301 (56.1%) | 74 / 301 (24.6%) | 58 / 301 (19.3%) |
| Internet browser | 78 / 156 (50%) | 35 / 156 (22.4%) | 43 / 156 (27.6%) |
| groupware | 24 / 47 (51.1%) | 12 / 47 (25.5%) | 11 / 47 (23.4%) |
| Other Internet access | 8 / 18 (44.4%) | 8 / 18 (44.4%) | 2 / 18 (11.1%) |

**Question 11**: Does every window, object, and control have a clearly named label?

| **Type of Software** | **Yes** | **No** | **Not Applicable** |
|---|---|---|---|
| Online database access | 133 / 170 (78.2%) | 13 / 170 (7.6%) | 24 / 170 (14.1%) |
| spreadsheet | 130 / 146 (89%) | 7 / 146 (4.8%) | 9 / 146 (6.2%) |
| word processor | 171 / 201 (85.1%) | 16 / 201 (8%) | 14 / 201 (7%) |
| e-mail | 134 / 159 (84.3%) | 15 / 159 (9.4%) | 10 / 159 (6.3%) |
| Other | 368 / 478 (77%) | 46 / 478 (9.6%) | 64 / 478 (13.4%) |
| database | 250 / 301 (83.1%) | 24 / 301 (8%) | 27 / 301 (9%) |
| Internet browser | 134 / 156 (85.9%) | 12 / 156 (7.7%) | 10 / 156 (6.4%) |
| groupware | 38 / 47 (80.9%) | 4 / 47 (8.5%) | 5 / 47 (10.6%) |
| Other Internet access | 14 / 18 (77.8%) | 2 / 18 (11.1%) | 2 / 18 (11.1%) |

**Question 12**: Does the software application use standard controls rather than owner-drawn or custom controls?

| **Type of Software** | **Yes** | **No** | **Not Applicable** |
|---|---|---|---|
| Online database access | 132 / 170 (77.6%) | 26 / 170 (15.3%) | 12 / 170 (7.1%) |
| spreadsheet | 135 / 146 (92.5%) | 4 / 146 (2.7%) | 7 / 146 (4.8%) |
| word processor | 184 / 201 (91.5%) | 8 / 201 (4%) | 9 / 201 (4.5%) |
| e-mail | 147 / 159 (92.5%) | 5 / 159 (3.1%) | 7 / 159 (4.4%) |
| Other | 397 / 478 (83.1%) | 34 / 478 (7.1%) | 47 / 478 (9.8%) |
| database | 234 / 301 (77.7%) | 42 / 301 (14%) | 25 / 301 (8.3%) |
| Internet browser | 141 / 156 (90.4%) | 7 / 156 (4.5%) | 8 / 156 (5.1%) |
| groupware | 40 / 47 (85.1%) | 3 / 47 (6.4%) | 4 / 47 (8.5%) |
| Other Internet access | 17 / 18 (94.4%) | 0 / 18 (0%) | 1 / 18 (5.6%) |

**Question 13**: Does the software have a user selectable option to display text on icons, i.e., text only icons or bubble help?

| **Type of Software** | **Yes** | **No** | **Not Applicable** |
|---|---|---|---|
| Online database access | 59 / 170 (34.7%) | 64 / 170 (37.6%) | 47 / 170 (27.6%) |
| spreadsheet | 113 / 146 (77.4%) | 13 / 146 (8.9%) | 20 / 146 (13.7%) |
| word processor | 152 / 201 (75.6%) | 18 / 201 (9%) | 31 / 201 (15.4%) |
| e-mail | 118 / 159 (74.2%) | 19 / 159 (11.9%) | 22 / 159 (13.8%) |
| Other | 263 / 478 (55%) | 100 / 478 (20.9%) | 115 / 478 (24.1%) |
| database | 140 / 301 (46.5%) | 55 / 301 (18.3%) | 106 / 301 (35.2%) |
| Internet browser | 118 / 156 (75.6%) | 16 / 156 (10.3%) | 22 / 156 (14.1%) |
| groupware | 32 / 47 (68.1%) | 4 / 47 (8.5%) | 11 / 47 (23.4%) |
| Other Internet access | 7 / 18 (38.9%) | 7 / 18 (38.9%) | 4 / 18 (22.2%) |

**Question 14**: Is the use of icons consistent throughout the application?

| **Type of Software** | **Yes** | **No** | **Not Applicable** |
|---|---|---|---|
| Online database access | 99 / 170 (58.2%) | 9 / 170 (5.3%) | 62 / 170 (36.5%) |
| spreadsheet | 135 / 146 (92.5%) | 2 / 146 (1.4%) | 9 / 146 (6.2%) |
| word processor | 179 / 201 (89.1%) | 6 / 201 (3%) | 16 / 201 (8%) |
| e-mail | 141 / 159 (88.7%) | 6 / 159 (3.8%) | 12 / 159 (7.5%) |
| Other | 354 / 478 (74.1%) | 24 / 478 (5%) | 100 / 478 (20.9%) |
| database | 184 / 301 (61.1%) | 21 / 301 (7%) | 96 / 301 (31.9%) |
| Internet browser | 142 / 156 (91%) | 5 / 156 (3.2%) | 9 / 156 (5.8%) |
| groupware | 38 / 47 (80.9%) | 2 / 47 (4.3%) | 7 / 47 (14.9%) |
| Other Internet access | 14 / 18 (77.8%) | 1 / 18 (5.6%) | 3 / 18 (16.7%) |

**Question 15**: Are menus with text equivalents provided for all icon functions or icon selections on menu, tool, and format bars?

| **Type of Software** | **Yes** | **No** | **Not Applicable** |
|---|---|---|---|
| Online database access | 77 / 170 (45.3%) | 25 / 170 (14.7%) | 68 / 170 (40%) |
| spreadsheet | 128 / 146 (87.7%) | 7 / 146 (4.8%) | 11 / 146 (7.5%) |
| word processor | 175 / 201 (87.1%) | 9 / 201 (4.5%) | 17 / 201 (8.5%) |
| e-mail | 138 / 159 (86.8%) | 9 / 159 (5.7%) | 12 / 159 (7.5%) |
| Other | 321 / 478 (67.2%) | 48 / 478 (10%) | 109 / 478 (22.8%) |
| database | 168 / 301 (55.8%) | 36 / 301 (12%) | 97 / 301 (32.2%) |
| Internet browser | 136 / 156 (87.2%) | 11 / 156 (7.1%) | 9 / 156 (5.8%) |
| groupware | 37 / 47 (78.7%) | 2 / 47 (4.3%) | 8 / 47 (17%) |
| Other Internet access | 13 / 18 (72.2%) | 2 / 18 (11.1%) | 3 / 18 (16.7%) |

**Question 16**: If there are audio alerts, are visual cues also provided? Note: Most operating systems handle this issue in the client/server environments; the question is most relevant in a dumb terminal environment.

| **Type of Software** | **Yes** | **No** | **Not Applicable** |
|---|---|---|---|
| Online database access | 53 / 170 (31.2%) | 22 / 170 (12.9%) | 95 / 170 (55.9%) |
| spreadsheet | 82 / 146 (56.2%) | 14 / 146 (9.6%) | 50 / 146 (34.2%) |
| word processor | 113 / 201 (56.2%) | 20 / 201 (10%) | 68 / 201 (33.8%) |
| e-mail | 104 / 159 (65.4%) | 8 / 159 (5%) | 47 / 159 (29.6%) |
| Other | 225 / 478 (47.1%) | 53 / 478 (11.1%) | 200 / 478 (41.8%) |
| database | 103 / 301 (34.2%) | 31 / 301 (10.3%) | 167 / 301 (55.5%) |
| Internet browser | 84 / 156 (53.8%) | 16 / 156 (10.3%) | 56 / 156 (35.9%) |
| groupware | 33 / 47 (70.2%) | 2 / 47 (4.3%) | 12 / 47 (25.5%) |
| Other Internet access | 5 / 18 (27.8%) | 1 / 18 (5.6%) | 12 / 18 (66.7%) |

| **Question 17**: Does the software support the "show sounds" feature where it is built into the operating system? | | | |
|---|---|---|---|
| **Type of Software** | **Yes** | **No** | **Not Applicable** |
| Online database access | 28 / 170 (16.5%) | 45 / 170 (26.5%) | 97 / 170 (57.1%) |
| spreadsheet | 87 / 146 (59.6%) | 17 / 146 (11.6%) | 42 / 146 (28.8%) |
| word processor | 122 / 201 (60.7%) | 26 / 201 (12.9%) | 53 / 201 (26.4%) |
| e-mail | 98 / 159 (61.6%) | 26 / 159 (16.4%) | 35 / 159 (22%) |
| Other | 199 / 478 (41.6%) | 94 / 478 (19.7%) | 185 / 478 (38.7%) |
| database | 92 / 301 (30.6%) | 56 / 301 (18.6%) | 153 / 301 (50.8%) |
| Internet browser | 87 / 156 (55.8%) | 31 / 156 (19.9%) | 38 / 156 (24.4%) |
| groupware | 26 / 47 (55.3%) | 5 / 47 (10.6%) | 16 / 47 (34%) |
| Other Internet access | 4 / 18 (22.2%) | 5 / 18 (27.8%) | 9 / 18 (50%) |

| **Question 18**: Can the user disable or adjust sound volume? | | | |
|---|---|---|---|
| **Type of Software** | **Yes** | **No** | **Not Applicable** |
| Online database access | 45 / 170 (26.5%) | 28 / 170 (16.5%) | 97 / 170 (57.1%) |
| spreadsheet | 108 / 146 (74%) | 7 / 146 (4.8%) | 31 / 146 (21.2%) |
| word processor | 144 / 201 (71.6%) | 15 / 201 (7.5%) | 42 / 201 (20.9%) |
| e-mail | 119 / 159 (74.8%) | 10 / 159 (6.3%) | 30 / 159 (18.9%) |
| Other | 257 / 478 (53.8%) | 46 / 478 (9.6%) | 175 / 478 (36.6%) |
| database | 118 / 301 (39.2%) | 47 / 301 (15.6%) | 136 / 301 (45.2%) |
| Internet browser | 104 / 156 (66.7%) | 16 / 156 (10.3%) | 36 / 156 (23.1%) |
| groupware | 33 / 47 (70.2%) | 5 / 47 (10.6%) | 9 / 47 (19.1%) |
| Other Internet access | 8 / 18 (44.4%) | 1 / 18 (5.6%) | 9 / 18 (50%) |

**Question 19**: If information is provided in an audio format, is it also capable of being displayed by the user in a visual format?

| **Type of Software** | **Yes** | **No** | **Not Applicable** |
|---|---|---|---|
| Online database access | 13 / 170 (7.6%) | 23 / 170 (13.5%) | 134 / 170 (78.8%) |
| spreadsheet | 50 / 146 (34.2%) | 15 / 146 (10.3%) | 81 / 146 (55.5%) |
| word processor | 68 / 201 (33.8%) | 27 / 201 (13.4%) | 106 / 201 (52.7%) |
| e-mail | 63 / 159 (39.6%) | 19 / 159 (11.9%) | 77 / 159 (48.4%) |
| Other | 129 / 478 (27%) | 69 / 478 (14.4%) | 280 / 478 (58.6%) |
| database | 62 / 301 (20.6%) | 40 / 301 (13.3%) | 199 / 301 (66.1%) |
| Internet browser | 53 / 156 (34%) | 26 / 156 (16.7%) | 77 / 156 (49.4%) |
| groupware | 15 / 47 (31.9%) | 4 / 47 (8.5%) | 28 / 47 (59.6%) |
| Other Internet access | 2 / 18 (11.1%) | 2 / 18 (11.1%) | 14 / 18 (77.8%) |

**Question 20**: Is the software application free of patterned backgrounds used behind text or important graphics?

| **Type of Software** | **Yes** | **No** | **Not Applicable** |
|---|---|---|---|
| Online database access | 145 / 170 (85.3%) | 9 / 170 (5.3%) | 16 / 170 (9.4%) |
| spreadsheet | 132 / 146 (90.4%) | 5 / 146 (3.4%) | 9 / 146 (6.2%) |
| word processor | 181 / 201 (90%) | 7 / 201 (3.5%) | 13 / 201 (6.5%) |
| e-mail | 140 / 159 (88.1%) | 7 / 159 (4.4%) | 12 / 159 (7.5%) |
| Other | 384 / 478 (80.3%) | 38 / 478 (7.9%) | 56 / 478 (11.7%) |
| database | 252 / 301 (83.7%) | 22 / 301 (7.3%) | 27 / 301 (9%) |
| Internet browser | 124 / 156 (79.5%) | 20 / 156 (12.8%) | 12 / 156 (7.7%) |
| groupware | 40 / 47 (85.1%) | 2 / 47 (4.3%) | 5 / 47 (10.6%) |
| Other Internet access | 13 / 18 (72.2%) | 2 / 18 (11.1%) | 3 / 18 (16.7%) |

**Question 21**: Can a user override default fonts for printing and text displays?

| **Type of Software** | **Yes** | **No** | **Not Applicable** |
|---|---|---|---|
| Online database access | 76 / 170 (44.7%) | 87 / 170 (51.2%) | 7 / 170 (4.1%) |
| spreadsheet | 136 / 146 (93.2%) | 2 / 146 (1.4%) | 8 / 146 (5.5%) |
| word processor | 187 / 201 (93%) | 3 / 201 (1.5%) | 11 / 201 (5.5%) |
| e-mail | 134 / 159 (84.3%) | 17 / 159 (10.7%) | 8 / 159 (5%) |
| Other | 333 / 478 (69.7%) | 87 / 478 (18.2%) | 58 / 478 (12.1%) |
| database | 154 / 301 (51.2%) | 125 / 301 (41.5%) | 22 / 301 (7.3%) |
| Internet browser | 133 / 156 (85.3%) | 14 / 156 (9%) | 9 / 156 (5.8%) |
| groupware | 35 / 47 (74.5%) | 9 / 47 (19.1%) | 3 / 47 (6.4%) |
| Other Internet access | 16 / 18 (88.9%) | 1 / 18 (5.6%) | 1 / 18 (5.6%) |

**Question 22**: Can a user adjust or disable flashing, rotating, or moving displays?

| **Type of Software** | **Yes** | **No** | **Not Applicable** |
|---|---|---|---|
| Online database access | 26 / 170 (15.3%) | 29 / 170 (17.1%) | 115 / 170 (67.6%) |
| spreadsheet | 76 / 146 (52.1%) | 7 / 146 (4.8%) | 63 / 146 (43.2%) |
| word processor | 103 / 201 (51.2%) | 15 / 201 (7.5%) | 83 / 201 (41.3%) |
| e-mail | 73 / 159 (45.9%) | 17 / 159 (10.7%) | 69 / 159 (43.4%) |
| Other | 174 / 478 (36.4%) | 72 / 478 (15.1%) | 232 / 478 (48.5%) |
| database | 66 / 301 (21.9%) | 66 / 301 (21.9%) | 169 / 301 (56.1%) |
| Internet browser | 75 / 156 (48.1%) | 28 / 156 (17.9%) | 53 / 156 (34%) |
| groupware | 14 / 47 (29.8%) | 5 / 47 (10.6%) | 28 / 47 (59.6%) |
| Other Internet access | 4 / 18 (22.2%) | 1 / 18 (5.6%) | 13 / 18 (72.2%) |

**Question 23**: Does the software ensure that color-coding is never used as the only means of conveying information or indicating an action?

| **Type of Software** | **Yes** | **No** | **Not Applicable** |
|---|---|---|---|
| Online database access | 103 / 170 (60.6%) | 27 / 170 (15.9%) | 40 / 170 (23.5%) |
| spreadsheet | 109 / 146 (74.7%) | 14 / 146 (9.6%) | 23 / 146 (15.8%) |
| word processor | 148 / 201 (73.6%) | 23 / 201 (11.4%) | 30 / 201 (14.9%) |
| e-mail | 118 / 159 (74.2%) | 12 / 159 (7.5%) | 29 / 159 (18.2%) |
| Other | 334 / 478 (69.9%) | 56 / 478 (11.7%) | 88 / 478 (18.4%) |
| database | 192 / 301 (63.8%) | 48 / 301 (15.9%) | 61 / 301 (20.3%) |
| Internet browser | 103 / 156 (66%) | 26 / 156 (16.7%) | 27 / 156 (17.3%) |
| groupware | 28 / 47 (59.6%) | 13 / 47 (27.7%) | 6 / 47 (12.8%) |
| Other Internet access | 15 / 18 (83.3%) | 1 / 18 (5.6%) | 2 / 18 (11.1%) |

**Question 24**: Does the application support user-defined color settings system-wide?

| **Type of Software** | **Yes** | **No** | **Not Applicable** |
|---|---|---|---|
| Online database access | 80 / 170 (47.1%) | 63 / 170 (37.1%) | 27 / 170 (15.9%) |
| spreadsheet | 125 / 146 (85.6%) | 12 / 146 (8.2%) | 9 / 146 (6.2%) |
| word processor | 170 / 201 (84.6%) | 17 / 201 (8.5%) | 14 / 201 (7%) |
| e-mail | 127 / 159 (79.9%) | 17 / 159 (10.7%) | 15 / 159 (9.4%) |
| Other | 326 / 478 (68.2%) | 77 / 478 (16.1%) | 75 / 478 (15.7%) |
| database | 171 / 301 (56.8%) | 82 / 301 (27.2%) | 48 / 301 (15.9%) |
| Internet browser | 129 / 156 (82.7%) | 14 / 156 (9%) | 13 / 156 (8.3%) |
| groupware | 35 / 47 (74.5%) | 7 / 47 (14.9%) | 5 / 47 (10.6%) |
| Other Internet access | 11 / 18 (61.1%) | 5 / 18 (27.8%) | 2 / 18 (11.1%) |

**Question 25**: Is highlighting also viewable with inverted colors?

| **Type of Software** | **Yes** | **No** | **Not Applicable** |
|---|---|---|---|
| Online database access | 95 / 170 (55.9%) | 47 / 170 (27.6%) | 28 / 170 (16.5%) |
| spreadsheet | 121 / 146 (82.9%) | 12 / 146 (8.2%) | 13 / 146 (8.9%) |
| word processor | 172 / 201 (85.6%) | 13 / 201 (6.5%) | 16 / 201 (8%) |
| e-mail | 122 / 159 (76.7%) | 14 / 159 (8.8%) | 23 / 159 (14.5%) |
| Other | 313 / 478 (65.5%) | 76 / 478 (15.9%) | 89 / 478 (18.6%) |
| database | 163 / 301 (54.2%) | 74 / 301 (24.6%) | 64 / 301 (21.3%) |
| Internet browser | 125 / 156 (80.1%) | 12 / 156 (7.7%) | 19 / 156 (12.2%) |
| groupware | 34 / 47 (72.3%) | 7 / 47 (14.9%) | 6 / 47 (12.8%) |
| Other Internet access | 10 / 18 (55.6%) | 5 / 18 (27.8%) | 3 / 18 (16.7%) |

**Question 26**: If the software application draws its own screen elements, does it pick up the size settings that the user has selected in the Control Panel?

| **Type of Software** | **Yes** | **No** | **Not Applicable** |
|---|---|---|---|
| Online database access | 59 / 170 (34.7%) | 36 / 170 (21.2%) | 75 / 170 (44.1%) |
| spreadsheet | 109 / 146 (74.7%) | 9 / 146 (6.2%) | 28 / 146 (19.2%) |
| word processor | 143 / 201 (71.1%) | 22 / 201 (10.9%) | 36 / 201 (17.9%) |
| e-mail | 109 / 159 (68.6%) | 15 / 159 (9.4%) | 35 / 159 (22%) |
| Other | 261 / 478 (54.6%) | 78 / 478 (16.3%) | 139 / 478 (29.1%) |
| database | 139 / 301 (46.2%) | 67 / 301 (22.3%) | 95 / 301 (31.6%) |
| Internet browser | 113 / 156 (72.4%) | 14 / 156 (9%) | 29 / 156 (18.6%) |
| groupware | 29 / 47 (61.7%) | 4 / 47 (8.5%) | 14 / 47 (29.8%) |
| Other Internet access | 10 / 18 (55.6%) | 2 / 18 (11.1%) | 6 / 18 (33.3%) |

**Question 27**: Are all manuals and documentation provided in electronic format as well as ASCII text files, including text descriptions of any charts, graphs, pictures, or graphics of any nature?

| **Type of Software** | **Yes** | **No** | **Not Applicable** |
|---|---|---|---|
| Online database access | 81 / 170 (47.6%) | 80 / 170 (47.1%) | 9 / 170 (5.3%) |
| spreadsheet | 84 / 146 (57.5%) | 53 / 146 (36.3%) | 9 / 146 (6.2%) |
| word processor | 118 / 201 (58.7%) | 71 / 201 (35.3%) | 12 / 201 (6%) |
| e-mail | 86 / 159 (54.1%) | 61 / 159 (38.4%) | 12 / 159 (7.5%) |
| Other | 253 / 478 (52.9%) | 160 / 478 (33.5%) | 65 / 478 (13.6%) |
| database | 147 / 301 (48.8%) | 113 / 301 (37.5%) | 41 / 301 (13.6%) |
| Internet browser | 83 / 156 (53.2%) | 61 / 156 (39.1%) | 12 / 156 (7.7%) |
| groupware | 35 / 47 (74.5%) | 9 / 47 (19.1%) | 3 / 47 (6.4%) |
| Other Internet access | 9 / 18 (50%) | 4 / 18 (22.2%) | 5 / 18 (27.8%) |

**Question 28**: Can a user choose to have any report generated by the software made available in a "print to ASCII file" format?

| **Type of Software** | **Yes** | **No** | **Not Applicable** |
|---|---|---|---|
| Online database access | 83 / 170 (48.8%) | 74 / 170 (43.5%) | 13 / 170 (7.6%) |
| spreadsheet | 107 / 146 (73.3%) | 24 / 146 (16.4%) | 15 / 146 (10.3%) |
| word processor | 150 / 201 (74.6%) | 26 / 201 (12.9%) | 25 / 201 (12.4%) |
| e-mail | 104 / 159 (65.4%) | 30 / 159 (18.9%) | 25 / 159 (15.7%) |
| Other | 239 / 478 (50%) | 127 / 478 (26.6%) | 112 / 478 (23.4%) |
| database | 179 / 301 (59.5%) | 96 / 301 (31.9%) | 26 / 301 (8.6%) |
| Internet browser | 90 / 156 (57.7%) | 39 / 156 (25%) | 27 / 156 (17.3%) |
| groupware | 27 / 47 (57.4%) | 10 / 47 (21.3%) | 10 / 47 (21.3%) |
| Other Internet access | 10 / 18 (55.6%) | 4 / 18 (22.2%) | 4 / 18 (22.2%) |

**Question 29**: Is special training provided for users with disabilities that will enable them to become familiar with the software and learn how to use it in conjunction with assistive technology provided as an accommodation?

| **Type of Software** | **Yes** | **No** | **Not Applicable** |
|---|---|---|---|
| Online database access | 66 / 170 (38.8%) | 62 / 170 (36.5%) | 42 / 170 (24.7%) |
| spreadsheet | 82 / 146 (56.2%) | 43 / 146 (29.5%) | 21 / 146 (14.4%) |
| word processor | 104 / 201 (51.7%) | 59 / 201 (29.4%) | 38 / 201 (18.9%) |
| e-mail | 87 / 159 (54.7%) | 45 / 159 (28.3%) | 27 / 159 (17%) |
| Other | 238 / 478 (49.8%) | 144 / 478 (30.1%) | 96 / 478 (20.1%) |
| database | 106 / 301 (35.2%) | 137 / 301 (45.5%) | 58 / 301 (19.3%) |
| Internet browser | 75 / 156 (48.1%) | 52 / 156 (33.3%) | 29 / 156 (18.6%) |
| groupware | 29 / 47 (61.7%) | 12 / 47 (25.5%) | 6 / 47 (12.8%) |
| Other Internet access | 7 / 18 (38.9%) | 6 / 18 (33.3%) | 5 / 18 (27.8%) |

*Software Appendix D*[1]

## Question-by-Question Responses to the Software Accessibility Checklist: Statistics by Level of Customization

**Question 1**: Does the software provide keyboard equivalents for all mouse actions, including buttons, scroll windows, text entry fields, and pop-up windows?

| **Customization** | **Yes** | **No** | **Not Applicable** |
|---|---|---|---|
| Commercial off-the-shelf software (used "as is") | 934 / 1124 (83.1%) | 125 / 1124 (11.1%) | 65 / 1124 (5.8%) |
| Commercial software, but modified for agency use | 140 / 185 (75.7%) | 20 / 185 (10.8%) | 25 / 185 (13.5%) |
| Custom software developed in-house | 106 / 198 (53.5%) | 34 / 198 (17.2%) | 58 / 198 (29.3%) |
| Custom software developed under contract | 95 / 169 (56.2%) | 42 / 169 (24.9%) | 32 / 169 (18.9%) |

**Question 2**: Does the program provide clear and precise instructions for use of all keyboard functions as part of the user documentation?

| **Customization** | **Yes** | **No** | **Not Applicable** |
|---|---|---|---|
| Commercial off-the-shelf software (used "as is") | 899 / 1124 (80%) | 150 / 1124 (13.3%) | 75 / 1124 (6.7%) |
| Commercial software, but modified for agency use | 136 / 185 (73.5%) | 34 / 185 (18.4%) | 15 / 185 (8.1%) |
| Custom software developed in-house | 105 / 198 (53%) | 60 / 198 (30.3%) | 33 / 198 (16.7%) |
| Custom software developed under contract | 108 / 169 (63.9%) | 50 / 169 (29.6%) | 11 / 169 (6.5%) |

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[1] This document is available on the Department of Justice's section 508 Web site (www.usdoj.gov/crt/508). People with disabilities may request copies in Braille, large print, or on computer disk by calling 1-800-514-0301 (voice) or 1-800-514-0383 (TTY).

**Question 3**: Are instructions regarding keyboard use widely available for all users in your component?

| **Customization** | **Yes** | **No** | **Not Applicable** |
|---|---|---|---|
| Commercial off-the-shelf software (used "as is") | 818 / 1124 (72.8%) | 219 / 1124 (19.5%) | 87 / 1124 (7.7%) |
| Commercial software, but modified for agency use | 133 / 185 (71.9%) | 36 / 185 (19.5%) | 16 / 185 (8.6%) |
| Custom software developed in-house | 115 / 198 (58.1%) | 55 / 198 (27.8%) | 28 / 198 (14.1%) |
| Custom software developed under contract | 114 / 169 (67.5%) | 43 / 169 (25.4%) | 12 / 169 (7.1%) |

**Question 4**: Does the software have a logical tabbing order among fields, text boxes, and focal points?

| **Customization** | **Yes** | **No** | **Not Applicable** |
|---|---|---|---|
| Commercial off-the-shelf software (used "as is") | 974 / 1124 (86.7%) | 61 / 1124 (5.4%) | 89 / 1124 (7.9%) |
| Commercial software, but modified for agency use | 165 / 185 (89.2%) | 5 / 185 (2.7%) | 15 / 185 (8.1%) |
| Custom software developed in-house | 156 / 198 (78.8%) | 8 / 198 (4%) | 34 / 198 (17.2%) |
| Custom software developed under contract | 149 / 169 (88.2%) | 10 / 169 (5.9%) | 10 / 169 (5.9%) |

**Question 5**: When navigating screens and dialog boxes using the keyboard, does the focus follow a logical tabbing order?

| **Customization** | **Yes** | **No** | **Not Applicable** |
|---|---|---|---|
| Commercial off-the-shelf software (used "as is") | 986 / 1124 (87.7%) | 54 / 1124 (4.8%) | 84 / 1124 (7.5%) |
| Commercial software, but modified for agency use | 155 / 185 (83.8%) | 11 / 185 (5.9%) | 19 / 185 (10.3%) |
| Custom software developed in-house | 157 / 198 (79.3%) | 6 / 198 (3%) | 35 / 198 (17.7%) |
| Custom software developed under contract | 145 / 169 (85.8%) | 14 / 169 (8.3%) | 10 / 169 (5.9%) |

**Question 6**: Is there a well-defined focal point that moves with keyboard navigation? (E.g., can you use the arrow keys to navigate through a list followed by pressing the ENTER key or space bar to select the desired item?)

| Customization | Yes | No | Not Applicable |
|---|---|---|---|
| Commercial off-the-shelf software (used "as is") | 963 / 1124 (85.7%) | 77 / 1124 (6.9%) | 84 / 1124 (7.5%) |
| Commercial software, but modified for agency use | 156 / 185 (84.3%) | 13 / 185 (7%) | 16 / 185 (8.6%) |
| Custom software developed in-house | 128 / 198 (64.6%) | 26 / 198 (13.1%) | 44 / 198 (22.2%) |
| Custom software developed under contract | 129 / 169 (76.3%) | 26 / 169 (15.4%) | 14 / 169 (8.3%) |

**Question 7**: Are shortcut keys provided for all pull-down menus?

| Customization | Yes | No | Not Applicable |
|---|---|---|---|
| Commercial off-the-shelf software (used "as is") | 779 / 1124 (69.3%) | 261 / 1124 (23.2%) | 84 / 1124 (7.5%) |
| Commercial software, but modified for agency use | 124 / 185 (67%) | 31 / 185 (16.8%) | 30 / 185 (16.2%) |
| Custom software developed in-house | 79 / 198 (39.9%) | 45 / 198 (22.7%) | 74 / 198 (37.4%) |
| Custom software developed under contract | 76 / 169 (45%) | 37 / 169 (21.9%) | 56 / 169 (33.1%) |

**Question 8**: Does the software support existing accessibility features built into the operating system (e.g., sticky keys, slow keys, repeat keys in Apple Macintosh OS or Microsoft Windows 95)?

| Customization | Yes | No | Not Applicable |
|---|---|---|---|
| Commercial off-the-shelf software (used "as is") | 884 / 1124 (78.6%) | 109 / 1124 (9.7%) | 131 / 1124 (11.7%) |
| Commercial software, but modified for agency use | 111 / 185 (60%) | 34 / 185 (18.4%) | 40 / 185 (21.6%) |
| Custom software developed in-house | 89 / 198 (44.9%) | 37 / 198 (18.7%) | 72 / 198 (36.4%) |
| Custom software developed under contract | 59 / 169 (34.9%) | 56 / 169 (33.1%) | 54 / 169 (32%) |

| **Question 9**: If timed responses are present, does the software allow the user to modify the timing parameters of any required timed responses? | | | |
|---|---|---|---|
| **Customization** | **Yes** | **No** | **Not Applicable** |
| Commercial off-the-shelf software (used "as is") | 234 / 1124 (20.8%) | 116 / 1124 (10.3%) | 774 / 1124 (68.9%) |
| Commercial software, but modified for agency use | 31 / 185 (16.8%) | 12 / 185 (6.5%) | 142 / 185 (76.8%) |
| Custom software developed in-house | 8 / 198 (4%) | 40 / 198 (20.2%) | 150 / 198 (75.8%) |
| Custom software developed under contract | 20 / 169 (11.8%) | 17 / 169 (10.1%) | 132 / 169 (78.1%) |

| **Question 10**: Are all descriptions or labels for fields positioned immediately to the left or directly above the control, and do they end in a colon, so that it is easy for screen reading software to associate the labels with the corresponding fields? | | | |
|---|---|---|---|
| **Customization** | **Yes** | **No** | **Not Applicable** |
| Commercial off-the-shelf software (used "as is") | 599 / 1124 (53.3%) | 228 / 1124 (20.3%) | 297 / 1124 (26.4%) |
| Commercial software, but modified for agency use | 97 / 185 (52.4%) | 47 / 185 (25.4%) | 41 / 185 (22.2%) |
| Custom software developed in-house | 94 / 198 (47.5%) | 70 / 198 (35.4%) | 34 / 198 (17.2%) |
| Custom software developed under contract | 98 / 169 (58%) | 57 / 169 (33.7%) | 14 / 169 (8.3%) |

| **Question 11**: Does every window, object, and control have a clearly named label? | | | |
|---|---|---|---|
| **Customization** | **Yes** | **No** | **Not Applicable** |
| Commercial off-the-shelf software (used "as is") | 945 / 1124 (84.1%) | 93 / 1124 (8.3%) | 86 / 1124 (7.7%) |
| Commercial software, but modified for agency use | 149 / 185 (80.5%) | 14 / 185 (7.6%) | 22 / 185 (11.9%) |
| Custom software developed in-house | 146 / 198 (73.7%) | 14 / 198 (7.1%) | 38 / 198 (19.2%) |
| Custom software developed under contract | 132 / 169 (78.1%) | 18 / 169 (10.7%) | 19 / 169 (11.2%) |

**Question 12**: Does the software application use standard controls rather than owner-drawn or custom controls?

| **Customization** | **Yes** | **No** | **Not Applicable** |
|---|---|---|---|
| Commercial off-the-shelf software (used "as is") | 1016 / 1124 (90.4%) | 47 / 1124 (4.2%) | 61 / 1124 (5.4%) |
| Commercial software, but modified for agency use | 150 / 185 (81.1%) | 23 / 185 (12.4%) | 12 / 185 (6.5%) |
| Custom software developed in-house | 142 / 198 (71.7%) | 28 / 198 (14.1%) | 28 / 198 (14.1%) |
| Custom software developed under contract | 119 / 169 (70.4%) | 31 / 169 (18.3%) | 19 / 169 (11.2%) |

**Question 13**: Does the software have a user selectable option to display text on icons, i.e., text only icons or bubble help?

| **Customization** | **Yes** | **No** | **Not Applicable** |
|---|---|---|---|
| Commercial off-the-shelf software (used "as is") | 799 / 1124 (71.1%) | 159 / 1124 (14.1%) | 166 / 1124 (14.8%) |
| Commercial software, but modified for agency use | 109 / 185 (58.9%) | 35 / 185 (18.9%) | 41 / 185 (22.2%) |
| Custom software developed in-house | 39 / 198 (19.7%) | 54 / 198 (27.3%) | 105 / 198 (53%) |
| Custom software developed under contract | 55 / 169 (32.5%) | 48 / 169 (28.4%) | 66 / 169 (39.1%) |

**Question 14**: Is the use of icons consistent throughout the application?

| **Customization** | **Yes** | **No** | **Not Applicable** |
|---|---|---|---|
| Commercial off-the-shelf software (used "as is") | 983 / 1124 (87.5%) | 46 / 1124 (4.1%) | 95 / 1124 (8.5%) |
| Commercial software, but modified for agency use | 139 / 185 (75.1%) | 6 / 185 (3.2%) | 40 / 185 (21.6%) |
| Custom software developed in-house | 78 / 198 (39.4%) | 12 / 198 (6.1%) | 108 / 198 (54.5%) |
| Custom software developed under contract | 86 / 169 (50.9%) | 12 / 169 (7.1%) | 71 / 169 (42%) |

**Question 15**: Are menus with text equivalents provided for all icon functions or icon selections on menu, tool, and format bars?

| **Customization** | **Yes** | **No** | **Not Applicable** |
|---|---|---|---|
| Commercial off-the-shelf software (used "as is") | 941 / 1124 (83.7%) | 79 / 1124 (7%) | 104 / 1124 (9.3%) |
| Commercial software, but modified for agency use | 125 / 185 (67.6%) | 19 / 185 (10.3%) | 41 / 185 (22.2%) |
| Custom software developed in-house | 58 / 198 (29.3%) | 27 / 198 (13.6%) | 113 / 198 (57.1%) |
| Custom software developed under contract | 69 / 169 (40.8%) | 24 / 169 (14.2%) | 76 / 169 (45%) |

**Question 16**: If there are audio alerts, are visual cues also provided? Note: Most operating systems handle this issue in the client/server environment; the question is most relevant in a dumb terminal environment.

| **Customization** | **Yes** | **No** | **Not Applicable** |
|---|---|---|---|
| Commercial off-the-shelf software (used "as is") | 650 / 1124 (57.8%) | 102 / 1124 (9.1%) | 372 / 1124 (33.1%) |
| Commercial software, but modified for agency use | 62 / 185 (33.5%) | 13 / 185 (7%) | 110 / 185 (59.5%) |
| Custom software developed in-house | 47 / 198 (23.7%) | 27 / 198 (13.6%) | 124 / 198 (62.6%) |
| Custom software developed under contract | 43 / 169 (25.4%) | 25 / 169 (14.8%) | 101 / 169 (59.8%) |

**Question 17**: Does the software support the “show sounds” feature where it is built into the operating system?

| **Customization** | **Yes** | **No** | **Not Applicable** |
|---|---|---|---|
| Commercial off-the-shelf software (used "as is") | 639 / 1124 (56.9%) | 189 / 1124 (16.8%) | 296 / 1124 (26.3%) |
| Commercial software, but modified for agency use | 48 / 185 (25.9%) | 34 / 185 (18.4%) | 103 / 185 (55.7%) |
| Custom software developed in-house | 26 / 198 (13.1%) | 48 / 198 (24.2%) | 124 / 198 (62.6%) |
| Custom software developed under contract | 30 / 169 (17.8%) | 34 / 169 (20.1%) | 105 / 169 (62.1%) |

| **Question 18**: Can the user disable or adjust sound volume? | | | |
|---|---|---|---|
| **Customization** | **Yes** | **No** | **Not Applicable** |
| Commercial off-the-shelf software (used "as is") | 776 / 1124 (69%) | 91 / 1124 (8.1%) | 257 / 1124 (22.9%) |
| Commercial software, but modified for agency use | 74 / 185 (40%) | 23 / 185 (12.4%) | 88 / 185 (47.6%) |
| Custom software developed in-house | 44 / 198 (22.2%) | 37 / 198 (18.7%) | 117 / 198 (59.1%) |
| Custom software developed under contract | 42 / 169 (24.9%) | 24 / 169 (14.2%) | 103 / 169 (60.9%) |

| **Question 19**: If information is provided in an audio format, is it also capable of being displayed by the user in a visual format? | | | |
|---|---|---|---|
| **Customization** | **Yes** | **No** | **Not Applicable** |
| Commercial off-the-shelf software (used "as is") | 397 / 1124 (35.3%) | 161 / 1124 (14.3%) | 566 / 1124 (50.4%) |
| Commercial software, but modified for agency use | 27 / 185 (14.6%) | 20 / 185 (10.8%) | 138 / 185 (74.6%) |
| Custom software developed in-house | 11 / 198 (5.6%) | 23 / 198 (11.6%) | 164 / 198 (82.8%) |
| Custom software developed under contract | 20 / 169 (11.8%) | 21 / 169 (12.4%) | 128 / 169 (75.7%) |

| **Question 20**: Is the software application free of patterned backgrounds used behind text or important graphics? | | | |
|---|---|---|---|
| **Customization** | **Yes** | **No** | **Not Applicable** |
| Commercial off-the-shelf software (used "as is") | 955 / 1124 (85%) | 81 / 1124 (7.2%) | 88 / 1124 (7.8%) |
| Commercial software, but modified for agency use | 162 / 185 (87.6%) | 13 / 185 (7%) | 10 / 185 (5.4%) |
| Custom software developed in-house | 147 / 198 (74.2%) | 10 / 198 (5.1%) | 41 / 198 (20.7%) |
| Custom software developed under contract | 147 / 169 (87%) | 8 / 169 (4.7%) | 14 / 169 (8.3%) |

**Question 21**: Can a user override defaults fonts for printing and text displays?

| **Customization** | **Yes** | **No** | **Not Applicable** |
|---|---|---|---|
| Commercial off-the-shelf software (used "as is") | 946 / 1124 (84.2%) | 103 / 1124 (9.2%) | 75 / 1124 (6.7%) |
| Commercial software, but modified for agency use | 112 / 185 (60.5%) | 61 / 185 (33%) | 12 / 185 (6.5%) |
| Custom software developed in-house | 67 / 198 (33.8%) | 103 / 198 (52%) | 28 / 198 (14.1%) |
| Custom software developed under contract | 79 / 169 (46.7%) | 78 / 169 (46.2%) | 12 / 169 (7.1%) |

**Question 22**: Can a user adjust or disable flashing, rotating, or moving displays?

| **Customization** | **Yes** | **No** | **Not Applicable** |
|---|---|---|---|
| Commercial off-the-shelf software (used "as is") | 523 / 1124 (46.5%) | 132 / 1124 (11.7%) | 469 / 1124 (41.7%) |
| Commercial software, but modified for agency use | 50 / 185 (27%) | 22 / 185 (11.9%) | 113 / 185 (61.1%) |
| Custom software developed in-house | 9 / 198 (4.5%) | 50 / 198 (25.3%) | 139 / 198 (70.2%) |
| Custom software developed under contract | 29 / 169 (17.2%) | 36 / 169 (21.3%) | 104 / 169 (61.5%) |

**Question 23**: Does the software ensure that color-coding is never used as the only means of conveying information or indicating an action?

| **Customization** | **Yes** | **No** | **Not Applicable** |
|---|---|---|---|
| Commercial off-the-shelf software (used "as is") | 810 / 1124 (72.1%) | 133 / 1124 (11.8%) | 181 / 1124 (16.1%) |
| Commercial software, but modified for agency use | 112 / 185 (60.5%) | 35 / 185 (18.9%) | 38 / 185 (20.5%) |
| Custom software developed in-house | 125 / 198 (63.1%) | 28 / 198 (14.1%) | 45 / 198 (22.7%) |
| Custom software developed under contract | 103 / 169 (60.9%) | 24 / 169 (14.2%) | 42 / 169 (24.9%) |

| **Question 24**: Does the application support user-defined color settings system-wide? | | | |
|---|---|---|---|
| **Customization** | **Yes** | **No** | **Not Applicable** |
| Commercial off-the-shelf software (used "as is") | 890 / 1124 (79.2%) | 121 / 1124 (10.8%) | 113 / 1124 (10.1%) |
| Commercial software, but modified for agency use | 118 / 185 (63.8%) | 45 / 185 (24.3%) | 22 / 185 (11.9%) |
| Custom software developed in-house | 85 / 198 (42.9%) | 71 / 198 (35.9%) | 42 / 198 (21.2%) |
| Custom software developed under contract | 81 / 169 (47.9%) | 57 / 169 (33.7%) | 31 / 169 (18.3%) |

| **Question 25**: Is highlighting also viewable with inverted colors? | | | |
|---|---|---|---|
| **Customization** | **Yes** | **No** | **Not Applicable** |
| Commercial off-the-shelf software (used "as is") | 870 / 1124 (77.4%) | 126 / 1124 (11.2%) | 128 / 1124 (11.4%) |
| Commercial software, but modified for agency use | 109 / 185 (58.9%) | 39 / 185 (21.1%) | 37 / 185 (20%) |
| Custom software developed in-house | 90 / 198 (45.5%) | 59 / 198 (29.8%) | 49 / 198 (24.7%) |
| Custom software developed under contract | 86 / 169 (50.9%) | 36 / 169 (21.3%) | 47 / 169 (27.8%) |

| **Question 26**: If the software application draws its own screen elements, does it pick up the size settings that the user has selected in the Control Panel? | | | |
|---|---|---|---|
| **Customization** | **Yes** | **No** | **Not Applicable** |
| Commercial off-the-shelf software (used "as is") | 784 / 1124 (69.8%) | 120 / 1124 (10.7%) | 220 / 1124 (19.6%) |
| Commercial software, but modified for agency use | 90 / 185 (48.6%) | 39 / 185 (21.1%) | 56 / 185 (30.3%) |
| Custom software developed in-house | 57 / 198 (28.8%) | 41 / 198 (20.7%) | 100 / 198 (50.5%) |
| Custom software developed under contract | 41 / 169 (24.3%) | 47 / 169 (27.8%) | 81 / 169 (47.9%) |

**Question 27**: Are all manuals and documentation provided in electronic format as well as ASCII text files, including text descriptions of any charts, graphs, pictures, or graphics of any nature?

| **Customization** | **Yes** | **No** | **Not Applicable** |
|---|---|---|---|
| Commercial off-the-shelf software (used "as is") | 628 / 1124 (55.9%) | 400 / 1124 (35.6%) | 96 / 1124 (8.5%) |
| Commercial software, but modified for agency use | 116 / 185 (62.7%) | 54 / 185 (29.2%) | 15 / 185 (8.1%) |
| Custom software developed in-house | 76 / 198 (38.4%) | 75 / 198 (37.9%) | 47 / 198 (23.7%) |
| Custom software developed under contract | 76 / 169 (45%) | 83 / 169 (49.1%) | 10 / 169 (5.9%) |

**Question 28**: Can a user choose to have any report generated by the software made available in a "print to ASCII file" format?

| **Customization** | **Yes** | **No** | **Not Applicable** |
|---|---|---|---|
| Commercial off-the-shelf software (used "as is") | 727 / 1124 (64.7%) | 216 / 1124 (19.2%) | 181 / 1124 (16.1%) |
| Commercial software, but modified for agency use | 111 / 185 (60%) | 54 / 185 (29.2%) | 20 / 185 (10.8%) |
| Custom software developed in-house | 69 / 198 (34.8%) | 90 / 198 (45.5%) | 39 / 198 (19.7%) |
| Custom software developed under contract | 82 / 169 (48.5%) | 70 / 169 (41.4%) | 17 / 169 (10.1%) |

**Question 29**: Is special training provided for users with disabilities that will enable them to become familiar with the software and learn how to use it in conjunction with assistive technology provided as an accommodation?

| **Customization** | **Yes** | **No** | **Not Applicable** |
|---|---|---|---|
| Commercial off-the-shelf software (used "as is") | 583 / 1124 (51.9%) | 337 / 1124 (30%) | 204 / 1124 (18.1%) |
| Commercial software, but modified for agency use | 97 / 185 (52.4%) | 49 / 185 (26.5%) | 39 / 185 (21.1%) |
| Custom software developed in-house | 61 / 198 (30.8%) | 90 / 198 (45.5%) | 47 / 198 (23.7%) |
| Custom software developed under contract | 53 / 169 (31.4%) | 84 / 169 (49.7%) | 32 / 169 (18.9%) |

# Telecommunications[1], [2]

Like other aspects of electronic information technology (EIT), telecommunications poses specific accessibility issues for almost every community of persons with disabilities. Some of today's barriers have easy technological solutions, while others do not. Among the people who are most affected by telecommunications accessibility are those who are deaf or hard of hearing and those with disabilities affecting speech. TTY's (text telephones, often called TDD's — "telecommunication devices for deaf persons") can be used by these people to communicate with others who also use TTY's, or — through the Telephone Relay Service (TRS) that was established by title IV of the Americans with Disabilities Act (ADA) — with others who use traditional voice telephones. Other individuals who are affected by telecommunications accessibility include those who have difficulty pressing touch-tone buttons, persons who are blind or who have low vision who cannot see visually displayed information such as message waiting or caller ID indicators, and persons with cognitive impairments or learning disabilities who have difficulty understanding or remembering serial connection choices (press *1* for ___; press *2* for ___; etc.).

Innovation in accessible telecommunications has dramatically increased in recent years, due in large part to the enactment of section 255 of the Telecommunications Act of 1996 (the Act). Unlike section 508 of the Rehabilitation Act, which only applies to federal agencies and departments, section 255 applies directly to those with the most control over the technology: the designers and manufacturers of telecommunications systems and equipment. Section 255 requires manufacturers of telecommunications systems and equipment and customer premises equipment to ensure that their products are designed, developed, and fabricated to be accessible to and usable by individuals with disabilities, if doing so is readily achievable. When it is not readily achievable to make the products accessible, the Act requires manufacturers to ensure that the equipment is compatible with existing peripheral devices or specialized customer premises equipment commonly used by persons with disabilities to achieve access, if doing so is readily achievable.

Innovation in the telecommunications industry will likely continue to provide federal agencies with an ever-increasing range of accessible products and services from which to choose.

## Telecommunications Findings

To determine the current level of accessibility of agencies' telecommunications products and services, the Component Questionnaire asked specific questions in each of the following categories:[3]

- providing direct access for TTY callers,
- making full use of the Telephone Relay Service,
- providing accessible pagers and paging systems,
- making all telecommunications services accessible to all persons, and
- evaluating overall telecommunications services for accessibility

Agencies were also asked to summarize their telecommunications findings and recommendations in an overall, subjective agency report.

### A. Providing Direct Access for TTY Callers (Questions 1, 2, 3, 5, 6, 10e).

A TTY is a device that is used in conjunction with a telephone to communicate with persons who are deaf, who are hard of hearing, or who have disabilities affecting speech. To communicate by TTY, a person types his or her conversation, which is read on a lighted display screen and/or paper printout feature of the TTY by the person who receives the call. Both parties must have TTY's to communicate. When typing on a TTY, each letter is transmitted by an electronic code called Baudot, which is sent from the TTY on the sending end of the call through the telephone line in the form of tones to the TTY on the receiving end of the call, the same way voiced communications occur between two parties. The receiving TTY transforms the tones back to letters on a small display screen and/or on a paper printout.

Communication between two persons using older models of TTY's can only occur in one direction at a time: both persons who are conversing cannot type to each other at the same time but must take turns sending and receiving. A person sending a communication by TTY indicates that he or she has finished transmitting by typing the command, "GA," which stands for "go ahead."

A person can also use a computer with a TTY modem and related software to communicate with someone who has a TTY or who has a computer with TTY software and a modem. Computers generally operate in American Standard Code for Information Exchange (ASCII), an electronic "language." A person who uses ASCII must use an ASCII/Baudot modem and related software to convert the ASCII code into Baudot code to communicate with another person who is using a Baudot-based system. Similarly, a person who is using a Baudot-based TTY must utilize conversion software to communicate with a person using an ASCII-based computer. Some TTY's can function in both Baudot and ASCII.

The Component Questionnaire asked several different questions to determine the extent to which TTY users (federal employees and members of the public) are able to communicate with federal agencies. Question 1 measured the extent to which TTY users are able to communicate directly with federal employees, that is, whether federal employees can receive TTY calls without relying on an outside relay service or third-party services. Direct access can be achieved by providing and advertising a dedicated TTY line or by maintaining standard telephone lines that are staffed by persons with both voice and TTY capabilities. The results of the survey were somewhat surprising: mid-sized agencies were significantly more likely to provide direct access to incoming TTY callers than larger or smaller agencies. This statistic may reflect a greater degree of centralized call centers among mid-sized agencies than others.

Question 2 asked whether agencies that used incoming call sequencing systems ensured that those systems were able to acknowledge a TTY call, send a "wait" message to the caller, and accept the call in sequence. Very few agencies offer this capability, even though many agencies — especially those in large and mid-sized categories — use incoming call sequencing systems. Interestingly, very small agencies do a much better job than others of ensuring that their incoming call sequencing systems are accessible to TTY users in this respect.

Question 3 focused more specifically on whether employee workstations — as opposed to incoming call centers — were equipped with TTY's or equivalent technology so that federal employees could accept direct TTY calls. Again, overall, mid-sized and very small agencies fared much better in this regard than did the large and small agencies.

The next direct-access TTY question, Question 5, asked whether any automated information services with prerecorded voice messages were also available in a text messaging mode that could be used by TTY callers. Very few agencies provide text message equivalents for automated information services, despite the fact that a large majority of components in all agency size categories provide automated information services for voice callers. Mid-sized agencies again fared the best in this regard.

More people who traditionally used TTY's are switching to other types of equivalent technology that often uses ASCII signals rather than Baudot tones. Question 6 of the Component Questionnaire was designed to determine whether agencies were equipped to handle incoming ASCII signal calls. Few agencies in any category size are equipped to handle ASCII calls unless the user converts the ASCII tones to Baudot tones by using special software.

To handle a large volume of calls more efficiently, a large majority of agencies in all size categories operate telephone services that require callers to select from an interactive menu of choices for proper connection (e.g., "press *1* for ____, press *2* for ____, etc.") or have sophisticated connection systems that allow callers to connect with a specific person by spelling the desired person's last name with the telephone keypads for connection purposes.

Question 10(e) was designed to determine whether these connection systems are accessible to TTY users. While few components of cabinet level and large agencies make such systems accessible to TTY users, a moderate number of components in all other agency size categories do so.

### B. Making full use of Telephone Relay Services (Question 4).

Prior to the late 1980's, people who were deaf or hard of hearing, as well as those who have disabilities affecting speech, were generally only able to call other people who had TTY's. Title IV of the Americans with Disabilities Act (ADA), which amended section 255 of the Telecommunications Act, 47 U.S.C. § 255, established the Telephone Relay Services (TRS) nationwide.[4] TRS enables telephone conversations between people who use TTY's and those who do not. Specifically, a TTY user may telephone a voice user by calling a TRS provider, where an operator will place the call to the voice user and relay the conversation by transcribing spoken content for the TTY user and reading text aloud for the voice user. Likewise, voice users may place calls to TTY users through the TRS.

### *A Promising Practice: The Social Security Administration's Broad Dissemination of TTY's and TTY-Enabled Computers*

The Social Security Administration has established four TDD units at Teleservice Centers (TSC) to answer toll-free 800 number calls from people who are deaf or hard of hearing. Each TSC has been equipped with computer TDD/modems that are installed in workstations on SSA's IWS/LAN (Individual Work Stations / Local Area Networks). The Albuquerque, New Mexico unit has four workstations, the Auburn, Washington unit has seven workstations, the Salinas, California unit has seven workstations, and the Baltimore, Maryland unit has eight workstations. All 800 number traffic is routed to the available workstations through the use of automated call sequencers. There are employees who work in the units on a full-time basis and others who rotate into the TDD units when needed. All employees working in the TDD units received special training on the equipment and the procedures for communicating with people who are deaf or who are hard of hearing.

In addition to the TDD units in the Teleservice Centers, each of SSA's over 1300 field offices is equipped with standalone TDD's to enable SSA personnel to work directly with people who use TDD's.

Almost all deaf employees within SSA have received an internal TDD as part of their IWS/LAN workstations. The internal TDD's support Baudot and ASCII communication protocols. All deaf employees received on-site training on the use of the TDD's in specialized training classes under the IWS/LAN contract. If an employee has not yet received an IWS/LAN workstation, he/she has been accommodated with a standalone TDD.

### *Frustrations Often Experienced by TTY Users*

TTY users often experience frustration regardless of whether they call through the Telephone Relay Service or directly to a federal agency's TTY number. Many report that when they call federal agencies' TTY numbers, they get TTY answering machines rather than a person. When they use the Telephone Relay Service and call the voice number, they are told to call back on the dedicated TTY line. Sometimes, federal employees automatically transfer the TRS caller to the TTY line, which then requires the TRS operator to terminate the connection.

Some people who are deaf or hard of hearing have understandable speech. Many such persons prefer to speak for themselves on the telephone, rather than have TRS operators voice their typewritten communication. This method of using TTY's is referred to as "voice carry over" (VCO). The VCO user will place a call through the TRS, will speak over the telephone to a nondisabled person, and the TRS operator will type the nondisabled person's communication for the VCO user to read on his or her TTY. The TRS operator usually does not interfere with the VCO user's spoken communication. "Hearing carry over" is the corresponding service that is available for people who can hear but who have disabilities affecting speech.

There are other types of relay services that do not require the use of a TTY, such as video relay interpreting[5] and speech-to-speech relay.[6] While some state TRS services and some private businesses offer these services, the Federal Information Relay Service (FIRS) does not.

While use of the TRS has a greater impact on an agency's ability to meet its general non-discrimination and reasonable accommodation obligations under sections 501 and 504 of the Rehabilitation Act, there are also implications for section 508: to the extent that an agency finds that it is an undue burden to develop, procure, maintain, or use telecommunications systems – including services, software, and equipment – that are accessible to persons who use TTY's, it must provide an accessible alternative way for TTY users to obtain the information that would have been obtained over a system that was directly usable by them, pursuant to section 508(a)(1)(B). The TRS can provide a cost-effective means for agencies to meet this obligation.

In many circumstances, federal agencies may provide a reasonable degree of communications access between employees who use TTY's and employees who use standard telephones, as well as between members of the public who use TTY's and employees who use standard telephones, by taking full advantage of the toll-free TRS.[7] Unfortunately, the self- evaluation revealed that the majority of agencies do not provide adequate training to their employees regarding the availability and use of the TRS.[8] This lack of training likely results in a significant underutilization of the TRS and in the provision of lesser government services to persons who are deaf or hard of hearing or who have disabilities affecting speech. Unlike some other aspects of telecommunications accessibility, improving the extent to which the federal government makes use of the TRS is relatively cost-free.

When agencies do not adequately train employees regarding how to use the TRS, members of the public, job applicants, and federal employees with disabilities are affected. Many federal employees are instructed not to accept collect calls on behalf of their agencies. Some may mistake TRS operators for collect call operators and refuse to accept calls placed by TTY users through the TRS.

### *How to Use the Federal Information Relay Service (FIRS)*

To place a call to a TTY user through FIRS, the caller should dial 1-800-877-8339 (voice or TTY). The FIRS line will emit TTY tones, then fax tones, then a voice operator will come on the line to assist nondisabled callers. FIRS is available from 8 a.m. to 8 p.m., Monday through Friday (except holidays), and may be used for any official government business.

### *A Lack of Training Among Nondisabled Personnel Officials Contributes to the Frustrations of Deaf and Hard of Hearing Federal Employees*

The experiences of a cabinet level agency's current employee illustrate some of the difficulties that can result from a lack of adequate training of administrative personnel. In November of 1998, the woman who is hard of hearing and uses TTY's to communicate telephonically applied for a position with the agency. A couple weeks after her interview in March of 1999, one of the people who interviewed the applicant called her on a TTY and told her that an officer would be extending a formal offer to her. After several weeks had passed without hearing anything more, the applicant took the initiative and called -- using the TRS -- the officer to inquire about the status of her application. The officer stated that she was glad the applicant had called and that she would like to extend a job offer to her. The officer promised to call her within a couple of days with more specific details. After a week had passed without the promised call, the applicant contacted the officer. Upon questioning, the officer admitted that she had not known how to call the applicant, since the applicant used a TTY. Although the component in which the officer was employed had numerous TTY's available, the officer did not know how to use them. The officer also admitted that she was unfamiliar with the TRS and did not know whom to ask for assistance. The applicant explained how the TRS worked and provided her with the correct number for the Federal Information Relay Service (FIRS). Ultimately, the applicant's employment was delayed and preliminary steps -- such as providing her fingerprints and obtaining a drug test for her security clearance -- were made more difficult due to this officer's lack of familiarity with the existing resources that were readily available to communicate with individuals with disabilities affecting hearing and speech.

### B. Providing Accessible Pagers and Paging Systems (Questions 7 and 8).

Only a decade ago, it would have been difficult, if not impossible, for federal agencies to provide paging services and equipment that provided users with options. Today, pagers and paging services allow for users to select notification via vibration, audio output, and/or visual display. Messages can be sent via direct TTY, TTY-to-voice translation, alphanumeric, e-mail, and digitized voice. Messages can be delivered via digital recordings, alphanumeric output, and even the font and size of visual messages can be set to user preferences. Many of these features, such as visual display screens, were developed and marketed for business men and women to enable them to be notified of incoming pages when use of audible tones would disrupt meetings. This technology can also provide federal employees who are deaf or hard of hearing with the same ability to receive pages as their peers.

Larger agencies are far more likely than smaller agencies to provide some employees with pagers. Almost all agencies that provide pagers use systems that allow the user to choose between audible or alternate (usually a vibration) notification for incoming pages. Slightly fewer use paging systems that provide users with a choice of audible or visual display pagers.

### C. Making Telephone Services Available to All Persons (Questions 9, 10a-d).

Federal agencies are using many more information telecommunications services than ever before. Caller ID, which informs the call recipient of a caller's identity before picking up the phone, allows the recipient to screen calls in a way that was only achievable before with the assistance of a highly effective secretary. Voice mail, now widely used, ensures that messages are not written down inaccurately or lost. Message waiting notification informs users when they have messages waiting in the voice mail system. Telephones equipped with the ability to display these and other types of visual information or status cues are becoming more common in the federal workplace. While many of these newer telephone services allow nondisabled federal employees to work more efficiently and effectively, a great many agencies are not ensuring that these services are accessible to persons who are blind or who have low vision, despite the availability of accessible alternatives.[9]

On the whole, larger agencies are more likely than smaller agencies to use these improved telephone services. Fewer than half of the agencies which provide caller ID services make them accessible for users who are blind or who have low vision. Roughly just over half of the agencies that provide message waiting notification services make those services accessible to people who are blind or who have low vision. The self-evaluation revealed no clear patterns regarding whether agencies made other types of visual information or status cues accessible to blind people or those who have low vision.

There is another type of telecommunications service that is not dependent on the user's desk-top equipment. More agencies, to increase efficiency and reduce personnel-related expenses, are requiring callers to navigate their telephone interactive menu systems or prerecorded messages through touch-tone menu selection rather than a human operator. Some of these systems require serial choices for proper connection, (e.g., "press *1* for ___, press *2* for ___, . . ."). Others require callers to spell a persons's last name with the telephone keypads, (e.g., to reach John Doe, the caller would press 3 - 6 - 3 as the numbers on the telephone keypad corresponding to D-O-E). Another variation on this theme is to provide a variety of prerecorded messages, often containing commonly requested information, that can be selected by choosing the appropriate touch-tone number corresponding to a menu option.

While these features can enhance an agency's operations, they can also present barriers for some people with disabilities. Persons with disabilities

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affecting manual dexterity may find it impossible or at least very difficult to press touch-tone buttons. Some persons with cognitive impairments or learning disabilities may have difficulty understanding or remembering the options presented to them. TTY users who call through the TRS generally have to call repeatedly to give the TRS operator an opportunity to accurately convey the full menu, have the caller communicate his or her choice, and ultimately choose the correct touch-tone to activate the system. Another real, though less obvious, problem is that most interactive menu connection systems have timed defaults which require callers to proceed at an average rate of speed or the call is terminated. Someone with significant cerebral palsy who pushes touch tone buttons with a pointing device held in her mouth may find that she cannot negotiate the system quickly enough.[10]

Most of these difficulties can be ameliorated if callers were provided the option to speak directly with a live operator for assistance. The self-evaluation revealed that a clear majority of agencies provide some operator assistance for their automated incoming call connection systems. A significant portion of these, however, do not provide operator assistance during all times that the lines are in use.

In spite of agency downsizing, agencies should be encouraged to retain live operators instead of going to fully automated systems.

Another way to increase the accessibility of automated call connection systems is to allow callers to modify the default time within which they are required to respond with their choices, or simply to maintain systems which do not have a timed response default setting at all. The self-evaluation revealed that very few agencies maintain systems that allowed users to modify default time settings; none of these are in the mid-sized, small, or very small agency size categories. Of the remaining components that maintain automated call connection systems, the percentages of agencies' systems that do not have default time settings at all (increasing these systems' accessibility) are inversely proportionate to the size of the agency. In other words, smaller agencies — which are likely to have a smaller volume of incoming calls — are less likely to require callers to make quick selections from interactive menu systems.

Lastly, for some people with disabilities, serial connection systems become accessible when the caller is given an option to activate the system through voice commands rather than touch-tone selections. Voice recognition technology has quickly become more accurate, widely available, and much less expensive than ever before. While few agencies in any size category currently provide a voice-response option, it is likely that more agencies will incorporate such options into their automated call connection systems in the near future as prices continue to drop and availability becomes more wide-spread.

### D. Evaluating Overall Telecommunications Services (Question 11).

After answering the specific questions regarding telecommunications accessibility, agency components were asked to describe the degree to which their telecommunications systems, overall, were accessible to users with disabilities (Question 11). Relatively few agencies concluded without reservation that their major telecommunications systems are generally accessible. Just less than half of agencies described their telecommunications applications as generally accessible, while recognizing problems in some fringe areas. Fewer mid-sized agencies than the larger or smaller agencies determined that *some* of their telecommunications applications excluded one or more communities of persons with disabilities, while roughly 20 percent of all agencies determined that their *major* telecommunications applications as generally inaccessible to one or more communities of persons with disabilities.

Most components noted that they had few problems making their pagers and paging systems accessible to persons with disabilities.

Many components noted that as a result of their self-evaluation, they already have placed TTY's in areas with frequent public contact, or are planning on doing so in the near future. In one instance, the Social Security Administration (SSA) provides stand-alone TTY's in the lobby areas, health centers and union offices at SSA Headquarter buildings, and ensures that pay phone TTY's are available for personal phone calls by employees and members of the public. Another instance, the Department of Labor intends to "establish a Department requirement to provide a TTY phone in all . . . human resource and finance offices," as well as security guard desks and stations. (Dept. of Labor, Overall Agency Evaluation, p. 7; [noted as pending within DOL]). The Department of Labor also intends to broadly distribute a list of locations of TTY's and the contact number for the Federal Information Relay Service. Id.

Many agencies, such as the National Archives and Records Administration (NARA), indicated in their overall agency evaluations that as they upgrade their telephone systems, they will consider accessibility as one of the primary issues. As NARA replaces its telephone system in 2001:

> . . . one of the primary functional requirements will be accessibility by TTY/TDD systems to provide access to recorded information and to serial choices that provide line connections. NARA will improve training and availability of operators who can assist TTY/TDD calls.

NARA's Overall Agency Evaluation at 4.

Other agencies are exploring options to correct some of the barriers identified during the self-evaluation process. For instance, the Merit Systems Protection Board is considering adding an attendant to its 800 information line and adding equivalent service for TTY users who cannot currently use the agency's toll-free information line. Merit Systems Protection Board's Overall Agency Report at 3. Similarly, the Civil Rights Commission is considering adding a text messaging mode to its automated information services which currently operate only with prerecorded voice messages. Civil Rights Commission's Overall Agency Report at 2. Still other agencies plan to make more modest changes, such as incorporating instructions regarding how to use the TRS into the next edition of the agency's telephone directory. Federal Maritime Commission's Overall Agency Report at 1.

Sometimes, it appears that the interdisciplinary nature of telecommunications accessibility solutions may stifle their acceptance. For instance, some of the common intra-agency budgeting, procurement, and personnel divisions between traditional "Information Technology" staff and telecommunications staff can stifle innovative, cost-effective approaches to solving some of the barriers identified in this Report. Therefore, agencies can provide direct access for TTY callers by purchasing software that, in essence, enables every desktop computer to function like a TTY. Computer-based TTY technology can be more cost-effective than outfitting federal workstations with stand-alone TTYs. In at least one cabinet-level agency, resistance has come from the telecommunications staff, who do not want to purchase software that would run on a secure network, as well as from the Information Technology staff, who do not see as their mission making the agency's telecommunications services more accessible to persons with disabilities. High-level leadership may be required to address some of these interdisciplinary issues.

On the other hand, some agencies have looked past the traditional divide between telecommunications and information technology, using telecommunications as a means to ensure that information otherwise provided via computers is available to everyone.

As in other areas, those agencies with more centralized administrative structures generally tended to be those who were best able to implement telecommunications accessibility solutions and who had the fewest telecommunications barriers. As telecommunications technology continues to advance, it will be important that all agencies – regardless of administrative structure – are able to timely and efficiently find and implement solutions to telecommunications barriers as they arise.

### *A Promising Practice: The Job Line of the National Federation of the Blind and the Department of Labor*

The Department of Labor provided a grant to the National Federation of the Blind (NFB) to develop "Job Line," a toll-free telephone access service that enables one-stop shopping for America's Job Bank and participating state job banks through the telephone, providing an alternative to the use of computers and the Internet. Job Line is designed to provide audible access rather than visual access for people with low vision or those who are blind, and to provide convenient and easy-to-use access to people who do not have a computer or cannot use standard computers. Job Line is available 24 hours a day and provides job announcements in a synthetic speech format. Callers are able to create and store personal job profiles and have the option of retrieving only the new and relevant job listings fitting the caller's search criteria. Callers are able to access "hot topics" channels that will provide customized job training and employment information and other types of notices. Users of the system can select one of nine different voices available and can also adjust the speaking rate. The voice selection and speaking rate chosen can be stored as part of the user's personal profile and reactivated each time the user enters the system. The user can obtain on-line help in the form of context-sensitive help information at any time during a job search or when entering a personal profile. Training in the use of the system and technical assistance to participating agencies and entities is provided by NFB. A short demonstration is available by calling 410-539-0818. More information is available on the National Federation of the Blind's Internet site (http://www.nfb.org).

## Telecommunications Recommendations

In light of these findings, the Department recommends the following:

1. Training. Each agency should train all federal employees who communicate by telephone with the public or with other employees on how to use TTY's, the Telephone Relay Service (TRS), and the Federal Information Relay Service (FIRS). GSA and the Access Board, in consultation with the FCC, should develop a short, electronic training module that can be made available through agency intranet sites at minimal expense.

2. TTY's in Public Areas. Each agency should provide TTY's, outlets, and shelves wherever the agency provides telephones for members of the public.

3. TTY's in Call Centers. Each agency should install TTY lines wherever it receives a large volume of incoming calls.

4. FIRS. GSA, in consultation with the FCC and other key agencies and inter-agency groups, should explore upgrading the Federal Information Relay Service (FIRS) to include video relay interpreting and speech-to-speech relay services.

5. Operators. Each cabinet level, large, and mid-sized agency should make operators available on its interactive automated telephone services and should allow callers to connect with operators by pressing "0" or by staying on the line. See General Appendix A (Categories of Agencies). Small and very small agencies should explore cost-sharing measures to provide operators for their interactive telephone services.

6. Equivalent Interactive TTY Telephone Services. Each agency should configure its interactive telephone systems to be compatible with TTY's – or should provide equivalent TTY interactive systems containing the same functions and information (and updated as often). This goal can be easily accomplished by adding a second telephone line with a TTY message and TTY compatible features that are equivalent to those provided on the interactive voice systems.

7. Equivalent TTY Toll-Free Information Services. Each agency that provides toll-free information lines should ensure that those lines support TTY use or the agency should maintain equivalent separate toll-free TTY information systems that are staffed to be as responsive as the standard toll-free information lines.

8. Computer-Based TTY Equivalency Systems. GSA and the Access Board, in consultation with the FCC and other key agencies and inter-agency groups, should explore purchasing a government-wide license (or multiple licenses to offer to agencies) of ASCII/computer-based TTY systems to ensure that all agencies' employees with networked computers have TTY equivalency on their network with minimal per-employee costs. Appropriate attention should be paid to factors such as computer network security.

9. Voice Recognition Technology. GSA and the Access Board, in consultation with the FCC and other key agencies and inter-agency groups, should explore buying multiple licenses for voice recognition technology to install on all agencies' interactive telephone systems.

10. 'Telecommunications Technology Assistance Center'. The FCC, in consultation with GSA, the

Access Board, and other key agencies and interagency groups, should establish a telecommunications technical assistance center. This Technical Assistance Center should assist agencies in working with manufacturers – for example, to reconfigure telephone systems to send a "wait" signal to TTY users – and to take full advantage of advances in technology that are coming from section 255 of the Telecom Act and section 508 of the Rehabilitation Act.

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[1] This document is available on the Department of Justice's section 508 Web site (www.usdoj.gov/crt/508). People with disabilities may request copies in Braille, large print, or on computer disk by calling 1-800-514-0301 (voice) or 1-800-514-0383 (TTY).

[2] The data underlying the analysis given below appears at Telecommunications Appendix A (Question-by-Question Results from the Component Questionnaire). Workforce statistics for weighing the telecommunications data are set forth in Telecommunications Appendix B.

[3] Because of these categories, some survey questions are discussed out of order in this Report.

[4] The provision of Telephone Relay Services required by title IV of the ADA is enforced by the Federal Communications Commission (FCC). See, "Frequently Asked Questions on Telecommunications Relay Service (TRS)," which is available on the FCC Web site (http://www.fcc.gov/Bureaus/Common_Carrier/FAQ/faq_trs.html). A directory of TRS providers is also available on FCC's Internet site (http://www.fcc.gov/dtf/trsphonebk.html).

[5] Video relay interpreting (VRI) allows a nondisabled person to speak over a telephone to a sign language interpreter in a remote location. A real-time video stream of the sign language interpreter "signing" the nondisabled person's words is fed through a computer to a deaf or hard of hearing person who then reads the interpreter's sign language and responds using sign language. A real-time video stream of the person who is deaf or hard of hearing is fed to the sign language interpreter, who then voices the signed communication to the nondisabled person over the telephone. Except for the use of technology, the process greatly resembles typical person-to-person communication via a sign language interpreter. On February 17, the FCC adopted new rules that make it easier for TRS providers to fund VRI services. FCC Docket CC 98-67.

[6] Speech-to-speech relay services are used by those whose speech is difficult for others to understand, such as some people who are profoundly hard of hearing or deaf and those who have disabilities affecting speech (i.e., cerebral palsy). Specially trained relay operators recite the words of the caller (or recipient) with a disability, allowing the person to communicate with others. On February 17, 2000, the FCC amended its rules to require TRS suppliers to provide speech-to-speech services. FCC Docket CC 98-67.

[7] There are some circumstances when it is inappropriate to rely on the TRS and when direct TTY service should be provided, such as for emergency call centers (i.e., 9-1-1 centers). Calls placed through the TRS take quite a bit longer than direct TTY connections and, because the relay operator may not be familiar with technical terms, can be less accurate.

[8] All Telephone Relay Service (TRS) providers, including the Federal Information Relay Service (FIRS), will provide employee training available upon request. Training generally covers:

- TTY etiquette, including
- instructing the voice caller to speak as though he or she was talking directly to the TTY caller, instead of through a third party
- using the expressions "go ahead" to signal the TTY user that it is his or her turn to communicate; and
- the confidentiality of all calls placed through the TRS.

[9] Some of the disability-friendly products and services that are now offered by mainstream telecommunications companies include:

- Repeat Dialing — Redials a busy line when the caller needs to get through; this is especially helpful for persons who have difficulty dialing the phone or remembering telephone numbers;
- Voice Dialing — Allows the user to dial handsfree by using voice commands instead of the keypad;

- Distinctive Ring — plays different ring patterns for additional telephone numbers; this is especially useful when maintaining separate voice/TTY numbers on same telephone;
- Talking Caller ID — Talking Caller ID audibly announces the telephone numbers of callers before the phone is picked up;
- TTY Caller ID — TTY Caller ID is a unit that attaches to the user's current phone or TTY that displays the names and numbers of callers before the phone is picked up;
- Voice mail can be programmed to remind people when to take their medication;
- Stutter tone: Audibly notifies the user when the receiver is picked up that messages are pending in voice mail by giving a tone that is different from the standard dial tone. This variation in tone is helpful to persons who cannot see visual message indicators; and
- Nib on the 5 key: Provides tactile location of number placement on keypad. This tactile reference point is especially useful for persons who cannot see the keypad.

[10] During the public comment period of the FCC's notice of proposed rulemaking for standards to implement section 255 of the Telecommunications Act, several persons pointed out how these technologies can become barriers to persons with disabilities:

- "People with disabilities have been terribly affected by such lack of access; many menus offer no option to connect with a human operator and they remain cut off from communication." Dana Mulvaney, commenter, "In re Sections 255 and 251(a)(2) of the Communications Act of 1934, as Amended by the Telecommunications Act of 1996," Federal Communications Commission's`Report and Order and Further Notice of Inquiry, FCC 99-181 (adopted July 14, 1999; released Sept. 29, 1999), at 51.
- "Voice mail and automated voice response systems, so common today, are impossible for many hard of hearing people to understand. Ears affected by hearing loss, even when properly fitted with hearing aids, cannot process sound as quickly as normal ears; by the time the first word or two are deciphered, the speaker is already on to the next sentence." Joan P. Ireland, commenter, Id. at n.237.

*Telecommunications Appendix A*[1]

## Question-by-Question Results from the Component Questionnaire

For the purpose of analyzing the telecommunications data, the Department has divided agencies into the following categories:

Cabinet-level agencies and large agencies (10,000 or more employees)
Mid-sized agencies (1,000-9,999 employees)
Small agencies (100-999 employees)
Very small agencies (fewer than 100 employees)

See General Appendix A (list of agencies by size category).

1. Does your component provide telephonic access to members of the public who have speech or hearing impairments and who use TTY's (text typewriter, sometimes also called a "TDD," or "telecommunications device for deaf persons") by advertising and maintaining dedicated TTY telephone lines that are staffed in a manner equal to that of your standard telephone lines or by ensuring TTY access to your standard lines for incoming callers?

   (Choose one) Yes No N/A

***Response "yes:" components providing direct access to TTY callers, comparable to others***

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[1] This document is available on the Department of Justice's section 508 Web site (www.usdoj.gov/crt/508). People with disabilities may request copies in Braille, large print, or on computer disk by calling 1-800-514-0301 (voice) or 1-800-514-0383 (TTY).

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* This is a weighted value measuring the number of full-time employees in these components compared with the total number of persons employed full-time by agencies in this size category. See Telecommunications Appendix B.

Seventy-six of 146 components of cabinet level and large agencies provide service to incoming TTY callers that is comparable to the service provided to others (45%*). Fifteen of 17 mid-sized agencies (82%*) advertise and maintain TTY telephone lines that are staffed in a manner equal to that of their standard incoming telephone lines. Eleven of 22 components of small agencies (59%*) provide direct telephonic access to TTY callers. Eight of 21 very small agencies (46%*) provide direct telephonic access to TTY callers.

***Response "no:" components not providing comparable direct access to TTY callers***

Fifty-seven of 146 components of cabinet level and large agencies indicated that they do not provide direct access to TTY callers (49%*). Only 2 mid-sized agencies do not (18%). Eleven of 22 components of small agencies (41%*) and 12 of the 21 very small agencies chose "no" (50%).

***Response "not applicable:" remaining components***

Thirteen of 146 components of cabinet level and large agencies chose the response "not applicable," indicating either that the components misunderstood the question or that they do not have telephone lines available to members of the public who wish to call them (6%*). No mid-sized or small agencies chose this response. Only 1 very small agency chose the response "not applicable" (4%).

2. Is your incoming call sequencing system, if any, able to acknowledge a TTY call, send a "wait" message to the caller, and accept the call in sequence?

   (Choose one) Yes No N/A

***Response "yes:" components maintaining incoming call sequencing systems that provide comparable access to TTY callers***

Twenty-four of 146 components of cabinet level and large agencies (4%*) and 4 of 17 mid-sized agencies (18%*) maintain incoming call sequencing systems that are able to acknowledge TTY calls, send "wait" messages to the caller, and accept the TTY calls in sequence. Only 2 small agencies chose "yes" (9%*), compared with 6 of 21 very small agencies (41%*).

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* This is a weighted value measuring the number of full-time employees in these components compared with the total number of persons employed full-time by agencies in this size category. See Telecommunications Appendix B.

***Response "no:" components maintaining incoming call sequencing systems that do not provide comparable access to TTY callers***

Seventy-two of 146 components of cabinet level and large agencies (53%*) and 6 of 17 mid-sized agencies (30%*) have incoming call sequencing systems that are not directly usable by TTY users. Sixteen of 22 components of small agencies (78%*) and 10 of 21 very small agencies (42%*) chose "no."

***Response "not applicable:" components presumably not maintaining incoming call sequencing systems***

Fifty of 146 components of cabinet level and large agencies (42%*) and 7 of 17 mid-sized agencies (52%*) chose the "not applicable" response to question 2, likely indicating that they do not have incoming call sequencing systems. Four of 22 components of small agencies (13%*) and 5 of 21 very small agencies (17%*) chose "not applicable."

3. Do all employees who communicate telephonically with members of the public or with other Federal employees have access to TTY's or equivalent technology at their workstations to receive calls placed by TTY users?

(Choose one) Yes No N/A

***Response "yes:" components providing TTY's or equivalent technology to all employees who use telephones***

Thirty-eight of 146 components of cabinet level and large agencies (4%*) and 5 of 17 mid-sized agencies provide access to TTY's or equivalent technology at their employees' workstations (35%*). Only 1 small agency chose "yes" (3.5%*), while 6 of 21 very small agencies did so (33%*).

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* This is a weighted value measuring the number of full-time employees in these components compared with the total number of persons employed full-time by agencies in this size category. See Telecommunications Appendix B.

***Response "no:" components not providing TTY's or equivalent technology to all employees who use telephones***

One hundred one of 146 components of cabinet level and large agencies (95%*) and 12 of 17 mid-sized agencies do not provide access to TTY's or equivalent technology at employees' workstations (65%*). Eighteen of 22 components of small agencies (87%*) and 14 of 21 very small agencies chose "no" (64%).

***Response "not applicable:" remaining components***

Seven of 146 components of cabinet level and large agencies (less than 1%*), no mid-sized agencies, 3 of 22 components of small agencies (9%*), and only 1 very small agency (3%) chose "not applicable."

4. Have all employees who communicate telephonically with members of the public or with other Federal employees who do not have access to TTY's or equivalent technology at their workstations received specific training on how to make and receive calls through the Telephone Relay Service?

(Choose one) Yes No N/A

***Response "yes:" components routinely training employees to use the Telephone Relay Service***

Eighteen of 146 components of cabinet level and large agencies (1%*) and 4 of 17 mid-sized agencies (17%*) routinely train their employees in how to make and accept calls through the Telephone Relay Service. Four of 22 components of small agencies (10%*) and 4 of 21 very small agencies (24%*) chose "yes."

***Response "no:" components not routinely training employees to use the Telephone Relay Service***

One hundred nine of 146 components of cabinet level and large agencies (84%*) and 12 of 17 mid-sized agencies (79%*) do not routinely train their employees how to use the Telephone Relay Service. Sixteen of 22 components of small agencies (82%*) and 15 of 21 very small agencies (69%*) chose "no."

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* This is a weighted value measuring the number of full-time employees in these components compared with the total number of persons employed full-time by agencies in this size category. See Telecommunications Appendix B.

***Response "not applicable:" components either providing TTY's at all workstations or not understanding the question***

Nineteen of 146 components of cabinet level and large agencies (15%*) and only 1 mid-sized agency (3%*) chose "not applicable." These agencies presumably either provide TTY's or equivalent technology at all workstations or they misunderstand the question. Two small agency components chose "not applicable (8%*), as did 2 very small agencies (7%*).

5. If your component uses any automated information services with prerecorded voice messages, for each such message, is the same information available in a text messaging mode that would support equivalent information access by TTY users?

(Choose one) Yes No N/A

***Response "yes:" components making their automated information services available to TTY callers***

Nineteen of 146 components of cabinet level and large agencies (3%*) and 4 of 17 mid-sized agencies (19%*) make automated information services available to TTY users to the same extent as they are available to those who can hear pre-recorded voice messages. Only 2 small agencies (8%*) make their automated information services accessible to TTY callers. No very small agency chose "yes."

***Response "no:" components not making their automated information services available to TTY callers***

Ninety-nine of 146 components of cabinet level and large agencies (94%*) and 12 of 17 mid-sized agencies (71%*) do not make automated information services available to TTY users to the same extent as they are available to those who can use pre-recorded voice messages. Seventeen of 22 components of small agencies (86%*) and 15 of 21 very small agencies (70%*) chose "no."

***Response "not applicable:" remaining components presumably not using automated information services with prerecorded voice messages***

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* This is a weighted value measuring the number of full-time employees in these components compared with the total number of persons employed full-time by agencies in this size category. See Telecommunications Appendix B.

Twenty-eight of 146 components of cabinet level and large agencies (2%*) and only 1 mid-sized agency (10%*) chose "not applicable," presumably indicating that it does not offer automated information services with pre-recorded voice messages. Three of 22 components of small agencies (6%*) and 6 of 21 very small agencies (30%*) chose "not applicable."

6. Do the TTY's (or equivalent technology) used by your component support other types of signals other than Baudot tones?

(Choose one) Yes No N/A

***Response "yes:" components providing TTY's that support types of signals other than Baudot tones***

Twenty-six of 146 components of cabinet level and large agencies (7%*) and 2 of 17 mid-sized agencies (21%*) use TTY's or equivalent technology that supports signals other than just Baudot tones. Only 2 small agencies (9%*) answered "yes," as did 2 very small agencies (16%*).

***Response "no:" components providing TTY's that only support Baudot tones***

Eighty-one of 146 components of cabinet level and large agencies (33%*) and 12 of 17 mid-sized agencies (62%*) use TTY's or equivalent technology that does not support signals other than Baudot tones. Twelve of 22 components of small agencies (67%*) and 9 of 21 very small agencies (47%*) chose "no."

***Response "not applicable:" remaining components***

Thirty-nine of 146 components of cabinet level and large agencies (60%*) and 3 of 17 mid-sized agencies (17%*) do not use TTY's or equivalent technology. Eight of 22 components of small agencies (24%*) and 10 of 21 very small agencies (37%*) chose "not applicable."

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* This is a weighted value measuring the number of full-time employees in these components compared with the total number of persons employed full-time by agencies in this size category. See Telecommunications Appendix B.

7. If your component uses pagers, is the system designed to handle both audible and visual display pagers?

(Choose one) Yes No N/A

***Response "yes:" components providing a choice of audible or visual display pagers***

Ninety-seven of 146 components of cabinet level and large agencies (84%*) and 14 of 17 mid-sized agencies (86%*) have accessible paging systems that provide users a choice of audible or visual display pagers. Eight of 22 components of small agencies (33%*) and 2 of 21 very small agencies (16%*) chose "yes."

***Response "no:" components providing pagers, but not offering a choice of audible or visual displays***

Twenty-nine of 146 components of cabinet level and large agencies (7%*) and 3 of 17 mid-sized agencies (14%*) use paging systems that are not designed to handle both audible and visual display pagers. Seven of 22 components of small agencies (27%*) and 2 of 21 very small agencies (19%*) chose "no."

***Response "not applicable:" components presumably not providing pagers***

Twenty of 146 components of cabinet level and large agencies (9%*) chose "not applicable," presumably indicating that they do not provide pagers to any employees. No mid-sized agencies chose this answer. Seven of 22 components of small agencies (40%*) and 17 of 21 very small agencies (65%*) chose "not applicable."

8. If your component uses pagers, is there a non-audible alternative to a "beep" notification for incoming pages, such as a vibration signal?

(Choose one) Yes No N/A

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* This is a weighted value measuring the number of full-time employees in these components compared with the total number of persons employed full-time by agencies in this size category. See Telecommunications Appendix B.

***Response "yes:" components providing pagers equipped vibration capability or other means of giving a non-audible alternative to a "beep" notification for incoming pages***

One hundred fourteen of 146 components of cabinet level and large agencies (84%*) and 16 of 17 mid-sized agencies (96%*) provide pagers that are equipped with a non-audible alternative to a "beep" notification for incoming pages. Thirteen of 22 components of small agencies (52%*) and 3 of 21 very small agencies (26%*) chose "yes."

***Response "no:" components providing pagers that are not equipped with any non-audible alternative to a "beep" notification for incoming pages***

Fourteen of 146 components of cabinet level and large agencies (7%*) and only 1 mid-sized agency (4%*) indicated that its pagers are not equipped with any non-audible alternative to a "beep" notification for incoming pages. Two of 22 components of small agencies (8%*) and no very small agency chose "no."

***Response "not applicable:" components presumably not providing pagers***

Eighteen of 146 components of cabinet level and large agencies (8%*) and no mid-sized agencies chose "not applicable." Seven of 22 components of small agencies (40%*) and 18 very small agencies (74%*) chose "not applicable."

9. If provided, are the following enhanced features of your component's telephone system accessible to persons with visual impairments or can they easily be made accessible using compatible assistive technology?

   a. caller ID

   b. message waiting notification

   c. all other visual information or status cues

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* This is a weighted value measuring the number of full-time employees in these components compared with the total number of persons employed full-time by agencies in this size category. See Telecommunications Appendix B.

***9(a): Response "yes:" components providing a means for employees who are blind or who have low vision to use caller ID***

Fifty-six of 146 components of cabinet level and large agencies (23%*) and 7 of 17 mid-sized agencies (36%*) indicated that they have a non-visual means of providing caller ID. Four of 22 components of small agencies (18%*) and 4 of 21 very small agencies (19%*) chose "yes."

***9(a): Response "no:" components not providing a means for employees who are blind or who have low vision to use caller ID***

Fifty-six of 146 components of cabinet level and large agencies (35%*) and 6 of 17 mid-sized agencies (51%*) indicated that they do not provide a means of making the caller ID feature accessible to persons who are blind or who have low vision. Nine of 22 components of small agencies (48%*) and 5 of 21 very small agencies (31%*) chose "no."

***9(a): Response "not applicable:" components presumably not providing caller ID***

Thirty-four of 146 components of cabinet level and large agencies (42%*) and 4 of 17 mid-sized agencies (13%) chose "not applicable," presumably indicating that they do not provide a caller ID feature for their telephone system. Nine of 22 components of small agencies (34%*) and 12 of 21 very small agencies (50%*) chose "not applicable."

***9(b): Response "yes:" components providing a means for employees who are blind or who have low vision to use message waiting notification***

Ninety-one of 146 components of cabinet level and large agencies (46%*) and 10 of 17 mid-sized agencies (59%) indicated that they provide a non-visual alternative to their message waiting notification service. Eleven of 22 components of small agencies (49%*) and 9 of 21 very small agencies (40%*) chose "yes."

***9(b): Response "no:" components not providing a means for employees who are blind or who have low vision to use message waiting notification***

Thirty-seven of 146 components of cabinet level and large agencies (31%*) and 7 of 17 mid-sized agencies (41%*) indicated that they do not provide a means for employees who are blind or who have low vision to use their message waiting notification service. Seven of 22 components of small agencies (35%*) and 4 of 21 very small agencies (21%*) chose "no."

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* This is a weighted value measuring the number of full-time employees in these components compared with the total number of persons employed full-time by agencies in this size category. See Telecommunications Appendix B.

### 9(b): Response "not applicable:" components presumably not providing message waiting notification

Eighteen of 146 components of cabinet level and large agencies (23%*) and no mid-sized agencies chose "not applicable," presumably indicating that they do not provide message waiting notification for their employees. Four of 22 components of small agencies (16%*) and 8 of 21 very small agencies (39%*) chose "not applicable."

### 9(c): Response "yes:" components providing a means for employees who are blind or who have low vision to use all other visual information or status cues on telephones

Fifty-five of 146 components of cabinet level and large agencies (20%*) and 7 of 17 mid-sized agencies (37%*) provide a means for employees who are blind or who have low vision to use all other visual information or status cues that are provided with their telephone services. Six of 22 components of small agencies (18%*) and 11 of 21 very small agencies (55%*) chose "yes."

### 9(c): Response "no:" components not providing a means for employees who are blind or who have low vision to use all other visual information or status cues on telephones

Sixty-one of 146 components of cabinet level and large agencies (56%*) and 8 of 17 mid-sized agencies (58%*) do not provide a means for employees who are blind or who have low vision to use all other visual information or status cues that are provided with their telephone services. Ten of 22 components of small agencies (57%*) and 3 of 21 very small agencies (17%*) chose "no."

### 9(c): Response "not applicable:" components presumably not providing any other visual information or status cues on telephones

Thirty of 146 components of cabinet level and large agencies (24%*) and two mid-sized agencies (5%*) chose "not applicable," presumably indicating that they do not have any other visual information or status cues provided with their telephone services. Six of 22 components of small agencies (25%*) and 7 of 21 very small agencies (28%*) chose "not applicable."

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* This is a weighted value measuring the number of full-time employees in these components compared with the total number of persons employed full-time by agencies in this size category. See Telecommunications Appendix B.

10. If your component operates any telephone lines that require serial choices for proper connection (e.g., "press *1* for [blank], press *2* for [blank], etc."), or if the system requires a caller to spell a person's name with the telephone keypads for connection purposes, answer the following:

a. Is there always an option to press *0* to connect with an operator for assistance?

b. If "yes," are the operators available at all times the lines are in use?

c. If timed defaults are used, is there a way for the caller to set the default time?

d. Is there a voice-operated option for persons who cannot press telephone keypads?

e. Is the system accessible to TTY users?

### *10(a) & (b) Response "yes:" agencies providing operator assistance from their automated incoming call connection systems*

Seventy-five of 146 components of cabinet level and large agencies (13%*) provide operator assistance from their automated incoming call connection systems. Of these, 33 components' operators are available at all times the lines are in use (3%*) while 42 components' operators are not (9%*).

Twelve of 17 mid-sized agencies (80%*) provide operator assistance from their automated incoming call connection systems. Of these, 7 agencies' operators are available at all times the lines are in use while 5 agencies' operators are not (30%*).

Fourteen of 22 components of small agencies (72%*) provide operator assistance from their automated incoming call connection systems. Six of these have operators who are available at all times the lines are in use (19%*) while 8 others are not (53%*).

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* This is a weighted value measuring the number of full-time employees in these components compared with the total number of persons employed full-time by agencies in this size category. See Telecommunications Appendix B.

Eleven of 21 very small agencies (65%*) provide operator assistance from their automated incoming call connection systems. Seven of these have operators who are available at all times the lines are in use (43%*) while 4 do not (22%*).

### *10(a) Response "no:" agencies not providing operator assistance from their automated incoming call connection systems*

Relatively few agencies do not provide operator assistance for their automated incoming call connection systems, including 36 of 146 components of cabinet level and large agencies (83%*), 4 of 17 mid-sized agencies (18%*), and 4 of 22 components of small agencies (19%*). Only 2 of 21 very small agencies (6%*) chose "no."

### *10(a) Response "not applicable:" agencies presumably not providing automated incoming call connection systems*

Thirty-five of 146 components of cabinet level and large agencies (4%*) chose "not applicable," presumably indicating that they do not provide automated incoming call connection systems. Only 1 of 17 mid-sized agencies chose "not applicable" (2%*). Four of 22 components of small agencies (9%*) and 8 of 21 very small agencies (28%*) also chose "not applicable."

### *10(c) Response "yes:" agencies using timed defaults that can be adjusted by the caller for their automated incoming call connection systems*

Nine of 146 components of cabinet level and large agencies (1%*) indicated that they use timed defaults on their automated incoming call connection systems that can be adjusted by the caller. No mid-sized, small, or very small agencies chose "yes."

### *10(c) Response "no:" agencies maintaining automated incoming call connection systems which use timed defaults that cannot be adjusted by the caller*

Seventy-three of 146 components of cabinet level and large agencies (65%*) and 12 of 17 mid-sized agencies (63%*) use automated incoming call connection systems which have timed defaults that cannot be adjusted by callers. Eight of 22 components of small agencies (49%*) and 5 of 21 very small agencies (24%*) chose "no."

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* This is a weighted value measuring the number of full-time employees in these components compared with the total number of persons employed full-time by agencies in this size category. See Telecommunications Appendix B.

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### *10(c) Response "not applicable:" agencies not maintaining automated incoming call connection systems or maintaining systems which do not use timed defaults*

Sixty-four of 146 components of cabinet level and large agencies (34%*) and 5 of 17 mid-sized agencies (37%*) do not maintain automated incoming call connection systems or maintain systems which do not use timed defaults. Fourteen of 22 components of small agencies (51%*) and 16 of 21 very small agencies (76%*) chose "not applicable."

### *10(d) Response "yes:" agencies maintaining automated incoming call connection systems which allow callers to use a voice operated option*

Seventeen of 146 components of cabinet level and large agencies (6%*) and 3 of 17 mid-sized agencies (13%*) maintain automated incoming call connection systems which allow callers to operate the system through voice, rather than requiring them to activate touch-tone buttons. No small agencies chose "yes," while 4 of 21 very small agencies chose this answer (19%*).

### *10(d) Response "no:" agencies maintaining automated incoming call connection systems which do not allow callers to use a voice operated option*

Ninety-five of 146 components of cabinet level and large agencies (89%*) and 13 of 17 mid-sized agencies (85%*) maintain automated incoming call connection systems which require callers to activate touch-tone buttons. Eighteen of 22 components of small agencies (91%*) and 11 of 21 very small agencies (69%*) chose "no."

### *10(d) Response "not applicable:" agencies presumably not maintaining automated incoming call connection systems*

Thirty-four of 146 components of cabinet level and large agencies (5%*) chose "not applicable," presumably indicating that they do not have automated incoming call connection systems. Only 1 mid-sized agency chose "not applicable" (2%*). Four of 22 components of small agencies (9%*) and 6 of 21 very small agencies (12%*) chose this response.

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* This is a weighted value measuring the number of full-time employees in these components compared with the total number of persons employed full-time by agencies in this size category. See Telecommunications Appendix B.

### *10(e) Response "yes:" agencies maintaining automated incoming call connection systems that are accessible to TTY users*

Thirty-eight of 146 components of cabinet level and large agencies (5%*) and 4 of 17 mid-sized agencies (29%*) maintain automated incoming call connection systems that are accessible to TTY users. Two of 22 components of small agencies (16%*) and 4 of 21 very small agencies (22%*) chose "yes."

### *10(e) Response "no:" agencies not maintaining an automated incoming call connection system that is accessible to TTY users*

Seventy-three of 146 components of cabinet level and large agencies (72%*) and 12 of 17 mid-sized agencies (69%*) maintain automated incoming call connection systems, but reported that those systems are not accessible to TTY users. Sixteen of 22 components of small agencies (75%*) and 9 of 21 very small agencies (50%*) chose "no."

### *10(e) Response "not applicable:" agencies presumably not maintaining an automated incoming call connection system*

Thirty-five of 146 components of cabinet level and large agencies (23%*) chose "not applicable," presumably indicating that they do not maintain an automated incoming call connection system. Only 1 mid-sized agency chose "not applicable" (2%*). Four of 22 components of small agencies (9%*) and 8 of 21 very small agencies (28%*) also chose this response.

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* This is a weighted value measuring the number of full-time employees in these components compared with the total number of persons employed full-time by agencies in this size category. See Telecommunications Appendix B.

11. What is the best description of the overall extent to which your telecommunications systems are accessible to and usable by persons with disabilities?

(a) major applications are generally accessible;

(b) generally accessible (a few problems exclude some persons with disabilities from "fringe" areas of our major applications, but generally all people with disabilities can use and navigate all major applications appropriately);

(c) problems with some of our major applications exclude one or more communities of people with disabilities from using them, but other major applications are generally accessible; or

(d) major applications are generally inaccessible to one or more communities of persons with disabilities.

### *Response "a:" agencies describing their major telecommunications applications as generally accessible*

Nineteen of 146 components of cabinet level and large agencies (5%*) and 3 of 17 mid-sized agencies (20%*) describe their major telecommunications applications as generally being accessible to persons with disabilities. Only 2 of 22 components of small agencies (4%*) chose response "a." along with 4 of 21 very small agencies (21%*).

### *Response "b:" agencies describing their major telecommunications applications as generally accessible, while recognizing problems in fringe areas*

Fifty-four of 146 components of cabinet level and large agencies (6%*) and 8 of 17 mid-sized agencies (48%*) describe their major telecommunications applications as generally accessible, though they recognize there are some fringe aspects of these applications that pose accessibility problems to some users with disabilities. Seven of 22 components of small agencies (34%*) and 6 of 21 very small agencies (42%*) also chose "b."

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* This is a weighted value measuring the number of full-time employees in these components compared with the total number of persons employed full-time by agencies in this size category. See Telecommunications Appendix B.

***Response "c:" agencies describing some of their telecommunications applications as excluding one or more communities of persons with disabilities***

Forty of 146 components of cabinet level and large agencies (40%*) and 2 of 17 mid-sized agencies (18%*) indicated that some of their telecommunications applications are not accessible to one or more communities of persons with disabilities. Nine of 22 components of small agencies (38%*) and 6 of 21 very small agencies (25%*) chose "c."

***Response "d:" agencies describing their major telecommunications applications as excluding one or more communities of persons with disabilities***

Thirty-three of 146 components of cabinet level and large agencies (49%*) and 4 of 17 mid-sized agencies (14%*) describe their major telecommunications applications as excluding one or more communities of persons with disabilities. Four of 22 components of small agencies (24%*) and 5 of 21 very small agencies (12%*) chose "d."

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* This is a weighted value measuring the number of full-time employees in these components compared with the total number of persons employed full-time by agencies in this size category. See Telecommunications Appendix B.

*Telecommunications Appendix B*[1]

# Workforce Statistics for Weighing Telecommunciations Data

Cabinet Level Agencies and Large Agencies ("Large Agencies" have 10,000+ employees)

| Agency | Component | Number of full-time employees counted in component's telecommunications data | Percentage of "Cabinet Level and Large Agencies" for Telecommunications |
|---|---|---|---|
| **Dept. of Agriculture** | Agricultural Marketing Service, Science & Technology, IT, PPA | 4299 | 0.1098 |
| | Agricultural Research Service, Administrative & Financial Management | 8167 | 0.2085 |
| | Departmental Administration | 701 | 0.0179 |
| | Economic Research Service | 533 | 0.0136 |
| | Farm Service Agency | 7290 | 0.1861 |
| | Food Safety Inspection Service | 9702 | 0.2477 |
| | Food and Nutrition Service | 1717 | 0.0438 |
| | Forest Service | 34,984 | 0.8932 |
| | National Agricultural Statistical Service | 1140 | 0.0291 |
| | Natural Resources Conservation Service | 11466 | 0.2928 |
| | Office of Civil Rights | [component's telecommunications data deleted as duplicative of data from Departmental Administration, upon instruction from agency] | 0.0000 |
| | Office of the Chief Information Officer | 272 | 0.0069 |
| | Rural Development/Operations and Management | 7139 | 0.1823 |

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[1] This document is available on the Department of Justice's section 508 Web site (www.usdoj.gov/crt/508). People with disabilities may request copies in Braille, large print, or on computer disk by calling 1-800-514-0301 (voice) or 1-800-514-0383 (TTY).

| Agency | Component | Number of full-time employees counted in component's telecommunications data | Percentage of "Cabinet Level and Large Agencies" for Telecommunications |
|---|---|---|---|
| | USDA Cooperative State Research, Education, and Extension Service | [component's telecommunications data deleted as duplicative of data from ARS, upon instruction from agency] | 0.0000 |
| **Dept. of Commerce** | Bureau of Economic Analysis | 437 | 0.0112 |
| | Bureau of Export Administration[2] | 4,249 | 0.1085 |
| | Bureau of the Census | 17,508 | 0.4470 |
| | National Institute of Standards and Technology | 3,666 | 0.0936 |
| | National Oceanic and Atmospheric Administration | 15,540 | 0.3968 |
| | U.S. Patent & Trademark Office | 6345 | 0.1620 |
| **Dept. of Defense** | Air Force Communications Agency | 534600 | 13.6497 |
| | Defense Advanced Research Projects Agency | 134 | 0.0034 |
| | Defense Contract Audit Agency | 3986 | 0.1018 |
| | Defense Finance and Accounting Service | 8310 | 0.2122 |
| | Defense Finance and Accounting Service Cleveland Center | [component's telecommunications data deleted as duplicative of data from DFAS, upon instruction from agency] | 0.0000 |
| | Defense Information Systems Agency | 6143 | 0.1568 |
| | Defense Logistics Agency | 39778 | 1.0156 |
| | Defense Manpower Data Center | 553 | 0.0141 |
| | Department Of Defense, Civilian Personnel Management Service | [component's telecommunications data deleted as duplicative of data from WHS, upon instruction from agency] | 0.0000 |

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[2] This operating unit's response also covers the questionnaire data for O/S, OIG, ITA, NTIA, ESA, EDA, TA, MBDA, and NTIS.

| Agency | Component | Number of full-time employees counted in component's telecommunications data | Percentage of "Cabinet Level and Large Agencies" for Telecommunications |
|---|---|---|---|
| | Department of the Navy, Office of the Chief Information Officer | 751400 | 19.1852 |
| | Office of the Secretary of the Army, ODISC4 | 705900 | 18.0235 |
| | Washington Headquarters Service, DIOR/S&S | 1498 | 0.0382 |
| **Dept. of Education** | Agency-wide response | 5200 | 0.1328 |
| **Dept. of Energy** | Bechtel Nevada | 300 | 0.0077 |
| | Brookhaven National Laboratory | No employment figures were provided by the agency | 0.0000 |
| | Department Of Energy Headquarters | 11,300 | 0.2885 |
| **Dept. of Health and Human Services** | Administration for Children and Families | 1494 | 0.0381 |
| | Centers for Disease Control and Prevention | 7090 | 0.1810 |
| | Food And Drug Administration | 8513 | 0.2174 |
| | Health Care Financing Administration | 4310 | 0.1100 |
| | Health Resources and Services Administration | 1910 | 0.0488 |
| | Indian Health Service | 13,388 | 0.3418 |
| | National Institutes of Health | 12,931 | 0.3302 |
| | Office of the Secretary | 2748 | 0.0702 |
| | Program Support Center | 1036 | 0.0265 |
| | Substance Abuse and Mental Health Services Administration | 608 | 0.0155 |
| **Dept. of Housing and Urban Development** | Agency-wide response | 10,051 | 0.2566 |

| Agency | Component | Number of full-time employees counted in component's telecommunications data | Percentage of "Cabinet Level and Large Agencies" for Telecommunications |
|---|---|---|---|
| **Dept. of Interior** | Bureau of Indian Affairs | 9343 | 0.2386 |
| | Bureau of Land Management | 9841 | 0.2513 |
| | Bureau of Reclamation | 5786 | 0.1477 |
| | Minerals Management Service | 1745 | 0.0446 |
| | National Business Center, Products and Services | [component's telecommunications data deleted as duplicative of data from NBC, Telecommunications, upon instruction from agency] | 0.0000 |
| | National Park Service | 19,918 | 0.5086 |
| | Office of Budget, Office of the Secretary | [component's telecommunications data deleted as duplicative of data from Small and Disadvantaged Business Utilization, upon instruction from agency] | 0.0000 |
| | Office of Hearings and Appeals<br>(scratch as duplicative of) | [component's telecommunications data deleted as duplicative of data from Small and Disadvantaged Business Utilization, upon instruction from agency] | 0.0000 |
| | Office of Information Resources Management | | 0.0000 |
| | Office of Inspector General | 238 | 0.0061 |
| | Office of the Secretary, National Business Center/ Telecommunications | 286 | 0.0073 |
| | Office of the Secretary/Policy, Management & Budget/Planning & Performance Management | [component's telecommunications data deleted as duplicative of data from Small and Disadvantaged Business Utilization, upon instruction from agency] | 0.0000 |
| | Office of Small and Disadvantaged Business Utilization | 1075 | 0.0274 |
| | Office of the Special Trustee/Office of Trust Funds Management | 312 | 0.0080 |

| Agency | Component | Number of full-time employees counted in component's telecommunications data | Percentage of "Cabinet Level and Large Agencies" for Telecommunications |
|---|---|---|---|
| | Office of Surface Mining Reclamation and Enforcement | 645 | 0.0165 |
| | U.S. Fish And Wildlife Service | 8117 | 0.2072 |
| | U.S. Geological Survey | 9482 | 0.2421 |
| **Dept. of Justice** | Antitrust Division | 586 | 0.0150 |
| | Civil Division | 1,003 | 0.0256 |
| | Civil Rights Division | 522 | 0.0133 |
| | Criminal Division | 758 | 0.0194 |
| | Drug Enforcement Administration | 8,734 | 0.2230 |
| | Environment and Natural Resources Division | 603 | 0.0154 |
| | Executive Office for Immigration Review | 964 | 0.0246 |
| | Executive Office for United States Attorneys | 9,444 | 0.2411 |
| | Executive Office for United States Trustees | 1,023 | 0.0261 |
| | Federal Bureau of Prisons | 30,927 | 0.7896 |
| | Immigration and Naturalization Service | 28,934 | 0.7388 |
| | Interpol - United States National Central Bureau | 63 | 0.0016 |
| | Justice Management Division, Information Management and Security Staff | 1996 | 0.0510 |
| | Office of the Inspector General | 395 | 0.0101 |
| | Office of Justice Programs | 780 | 0.0199 |
| | Office of the Pardon Attorney | 15 | 0.0004 |
| | Office of the Solicitor General | 43 | 0.0011 |
| | Tax Division | 543 | 0.0139 |
| | United States Marshals Service | 3,990 | 0.1019 |

| Agency | Component | Number of full-time employees counted in component's telecommunications data | Percentage of "Cabinet Level and Large Agencies" for Telecommunications |
|---|---|---|---|
|  | U.S. Parole Commission | 72 | 0.0018 |
| **Dept. of Labor** | Employment Standards Administration | 4021 | 0.1027 |
|  | Mine Safety and Health Administration | 2206 | 0.0563 |
|  | Pension and Welfare Benefits Administration | 229 | 0.0058 |
|  | Office of the Assistant Secretary for Administrative Management | 2598 | 0.0663 |
|  | Office of the Inspector General | 420 | 0.0107 |
|  | Occupational Safety and Health Administration | 2263 | 0.0578 |
|  | Employment and Training Administration/Office of Technology | 850 | 0.0217 |
|  | Bureau of Labor Statistics | 3000 | 0.0766 |
|  | President Committee on Employment People with Disabilities | [component's telecommunications data deleted as duplicative of data from OASAM, upon instruction from agency] | 0.0000 |
| **Dept. of State** | United States Information Agency | 6352 | 0.1622 |
|  | AF/EX | 35 | 0.0009 |
|  | Office of International Organizations | 141 | 0.0036 |
|  | Bureau of Economics and Business Affairs | 180 | 0.0046 |
|  | Bureau of Population, Refugees, and Migration | 88 | 0.0022 |
|  | Bureau of East Asian and Pacific Affairs | 200 | 0.0051 |
|  | Office of the Legal Adviser | 202 | 0.0052 |
|  | Bureau of European Affairs | 250 | 0.0064 |
|  | Bureau of Oceans and International Environmental and Scientific Affairs | 159 | 0.0041 |

| Agency | Component | Number of full-time employees counted in component's telecommunications data | Percentage of "Cabinet Level and Large Agencies" for Telecommunications |
|---|---|---|---|
| | Office of Inspector General | 300 | 0.0077 |
| | Bureau of Financial Management and Policy | 548 | 0.0140 |
| | Arms Control Bureau | 250 | 0.0064 |
| | Foreign Service Institute | 550 | 0.0140 |
| | S/S-IRM Office of Secretariat Systems | 526 | 0.0134 |
| | Office of Humanitarian Demining Programs | 12 | 0.0003 |
| | Bureau of Diplomatic Security | 1300 | 0.0332 |
| **Dept. of Transportation** | National Highway Traffic Safety Administration | 606 | 0.0155 |
| | Federal Highway Administration | 2,900 | 0.0740 |
| | Research and Special Programs Administration | 867 | 0.0221 |
| | Transportation Administrative Service Center | 857 | 0.0219 |
| | Federal Transit Administration | 495 | 0.0126 |
| | United States Coast Guard | 89,000 | 2.2724 |
| | Federal Railroad Administration | 729 | 0.0186 |
| | Federal Aviation Administration | 49,459 | 1.2628 |
| | Maritime Administration | 967 | 0.0247 |
| | Office of the Secretary | 664 | 0.0170 |
| **Dept. of Treasury** | Bureau of the Public Debt | 1,840 | 0.0470 |
| | Federal Law Enforcement Training Center | 545 | 0.0139 |
| | U.S. Secret Service | 4,908 | 0.1253 |
| | Financial Management Service | 2,122 | 0.0542 |
| | Office of the Comptroller of the Currency | 2,945 | 0.0752 |

| Agency | Component | Number of full-time employees counted in component's telecommunications data | Percentage of "Cabinet Level and Large Agencies" for Telecommunications |
|---|---|---|---|
| | Bureau of Alcohol, Tobacco, and Firearms | 4,033 | 0.1030 |
| | Office of Thrift Supervision | 1,251 | 0.0319 |
| | Internal Revenue Service | 113,720 | 2.9036 |
| | Office of Inspector General | 277 | 0.0071 |
| | Departmental Offices | 1,532 | 0.0391 |
| | U.S. Mint | 2,095 | 0.0535 |
| | Bureau of Engraving and Printing | 2,558 | 0.0653 |
| | U.S. Customs Service | 20,593 | 0.5258 |
| **Dept. of Veterans' Affairs** | Dep. Asst Sec for Acq. and Materiel Management, Business Office (91A) | 180,000 | 4.5959 |
| | Asst Sec for I&T, Austin Automation Center | 60,000 | 1.5320 |
| **Environmental Protection Agency** | Office of Policy | 291 | 0.0074 |
| | Office of Research and Development | 1976 | 0.0505 |
| | Office of Solid Waste & Emergency Response | 620 | 0.0158 |
| | Region 1 | 733 | 0.0187 |
| | Region 2 | 956 | 0.0244 |
| | Region 3 | 944 | 0.0241 |
| | Region 6 | 928 | 0.0237 |
| | Region 7 | 580 | 0.0148 |
| **Executive Office of the President** | Agency-wide response | 1510 | 0.0386 |
| **General Services Administration** | Agency-wide response | 14,500 | 0.3702 |
| **National Aeronautics and Space Administration** | John C. Stennis Space Center | 258 | 0.0066 |

| Agency | Component | Number of full-time employees counted in component's telecommunications data | Percentage of "Cabinet Level and Large Agencies" for Telecommunications |
|---|---|---|---|
|  | Dryden Flight Research Center | 602 | 0.0154 |
|  | Goddard Space Flight Center | 3000 | 0.0766 |
|  | John H. Glenn Research Center at Lewis Field | 2019 | 0.0516 |
|  | Headquarters | 968 | 0.0247 |
|  | Ames Research Center | 1465 | 0.0374 |
|  | Lyndon B. Johnson Space Center | 2980 | 0.0761 |
|  | NASA Langley Research Center | 2273 | 0.0580 |
|  | John F. Kennedy Space Center | 1729 | 0.0441 |
|  | George C. Marshall Space Flight Center | 2564 | 0.0655 |
| **Social Security Administration** | Agency-wide response | 64,000 | 1.6341 |
| **Tennessee Valley Authority** | Agency-wide response | 13,500 | 0.3447 |
| **United States Postal Service** | Agency-wide response | 800,000 | 20.4261 |

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Mid-Sized Agencies (1000-9,999 employees)[3]

| Agency | Number of full-time employees counted in agency's telecommunications data | Percentage of "Mid-Sized Agencies" for Telecommunications |
|---|---|---|
| **Agency for Int'l Development** | 7289 | 14.9 |
| **Equal Employment Opportunity Commission** | 2850 | 5.8 |
| **Federal Communications Commission** | 2000 | 4.1 |
| **Federal Deposit Insurance Corporation** | 7387 | 15.1 |
| **Federal Emergency Management Agency** | 2210 | 4.5 |
| **Federal Reserve Board** | 1700 | 3.5 |
| **Federal Trade Commission** | 1135 | 2.3 |
| **National Archives and Records Administration** | 3200 | 6.5 |
| **National Credit Union Administration** | 1000 | 2.0 |
| **National Labor Relations Board** | 1900 | 3.9 |
| **National Science Foundation** | 1300 | 2.7 |
| **Nuclear Regulatory Commission** | 2800 | 5.7 |
| **Office of Personnel Management** | 3200 | 6.5 |
| **Pension Benefit Guaranty Corporation** | 1450 | 3.0 |
| **Railroad Retirement Board** | 1196 | 2.4 |
| **Securities and Exchange Commission** | 3500 | 7.2 |
| **Small Business Administration** | 4817 | 9.8 |

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[3] All "Mid-Sized" agencies provided agency-wide data for the Telecommunications portion of the Component Questionnaire.

Small Agencies (100-999 employees)

| Agency | Component | Number of full-time employees counted in component's telecommunications data | Percentage of "Small Agencies" for Telecommunications |
|---|---|---|---|
| **Commodity Futures Trading Commission** | | 550 | 8.0 |
| **Consumer Product Safety Commission** | | 478 | 6.9 |
| **Corporation for National and Community Service** | | 600 | 8.7 |
| **Defense Nuclear Facilities Safety Board** | | 104 | 1.5 |
| **Export-Import Bank of the United States** | | 400 | 5.8 |
| **Farm Credit Administration** | | 300 | 4.3 |
| **Federal Election Commission** | Information Division | 351 | 5.1 |
| | Telecommunications/ Faxline | 351 | 5.1 |
| **Federal Housing Finance Board** | | 110 | 1.6 |
| **Federal Labor Relations Authority** | | 211 | 3.1 |
| **Federal Maritime Commission** | | 138 | 2.0 |
| **Federal Mediation and Conciliation Service** | | 200 | 2.9 |
| **Federal Retirement Thrift Investment Board** | | 100 | 1.4 |
| **International Trade Commission** | | 400 | 5.8 |
| **Merit Systems Protection Board** | | 240 | 3.5 |
| **National Endowment for the Arts** | | 160 | 2.3 |

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[4] The FEC provided 2 agency-wide responses for the Telecommunications portion of the Component Questionnaire, as it has two separate telephone systems that are available to all employees. All 351 FEC employees were attributed to both sets of FEC's telecommunications data; each employee was, in essence, counted twice for the purposes of calculating the weighted percentages pertaining to telecommunications.

| Agency | Component | Number of full-time employees counted in component's telecommunications data | Percentage of "Small Agencies" for Telecommunications |
|---|---|---|---|
| **National Endowment for the Humanities** | | 175 | 2.5 |
| **National Transportation Safety Board** | | 402 | 5.8 |
| **Overseas Private Investment Corporation** | | 200 | 2.9 |
| **Peace Corps**[5] | | 870 | 12.6 |
| **Selective Service System** | | 170 | 2.5 |
| **United States Holocaust Memorial Museum** | | 400 | 5.8 |

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[5] In addition to its full-time employees, the Peace Corps has approximately 6,700 volunteers. For calculation purposes, we did not include these persons in the total number of "employees" of the Peace Corps, as they typically are in the field and do not have access to EIT to which section 508 pertains.

Very Small Agencies (fewer than 100 employees)[6]

| Agency | Number of full-time employees counted in agency's telecommunication data | Percentage of "Very Small Agencies" for Telecommunications |
|---|---|---|
| **Advisory Council on Historic Preservation** | 34 | 3.7 |
| **African Development Foundation** | 33 | 1.1 |
| **Architectural and Transportation Barriers Compliance Board ("Access Board")** | 30 | 3.3 |
| **Commission on Civil Rights** | 90 | 9.8 |
| **Commission on Fine Arts** | 7 | 0.8 |
| **Committee for Purchase for People Who are Blind or Severely Disabled** | 20 | 2.2 |
| **Federal Mine Safety and Health Review Commission** | 50 | 5.4 |
| **Institute of Museum and Library Services** | 40 | 4.3 |
| **Inter-American Foundation** | 65 | 7.1 |
| **Japan-U.S. Friendship Commission** | 4 | 0.4 |
| **Marine Mammal Commission** | 10 | 1.1 |
| **National Capital Planning Commission** | 50 | 5.4 |
| **National Commission on Libraries and Information Science** | 7 | 0.8 |
| **National Council on Disability** | 10 | 1.1 |
| **National Mediation Board** | 50 | 5.4 |
| **Occupational and Safety and Health Review Commission** | 70 | 7.6 |
| **Office of Government Ethics** | 85 | 9.2 |
| **Office of Navajo and Hopi Relocation** | 65 | 7.1 |
| **Office of Special Counsel** | 95 | 10.3 |
| **Postal Rate Commission** | 55 | 6.0 |
| **Trade and Development Agency** | 50 | 5.4 |

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[6] The American Battle Monuments Commission did not provide any telecommunications data.

# Kiosks and Other Information Transaction Machines (ITMs)[1]

Few agencies use information kiosks, point-of-sale card reading machines, interactive electronic building directories, or other types of 'information transaction machines,' also called 'ITMs.' Fifty-nine of the 81 agencies reported that they do not use ITMs of any kind.

Examples of ways that agencies use ITMs include:

- providing the public with up-to-date information of locally available HUD homes;
- allowing customers to use credit cards to purchase goods at military base stores; and
- providing updated information of federal employment opportunities, nation-wide.

People with most types of disabilities encounter barriers to use for existing federal ITMs. People with mobility impairments, such as those who use wheelchairs, often find that the ITMs are located on inaccessible routes or do not have sufficient clear floor space to all people who use wheelchairs to approach them. Blind people are rarely able to use federal ITMs, since most of them provide information exclusively in a visual format — often using touchscreen technology. Many people with low vision have difficulty using federal ITM's, as most do not allow users to change color settings or display sizes. People who are deaf or hard of hearing encounter fewer barriers, as most ITMs do not convey information audibly. People who cannot read or who have difficulty reading due to cognitive impairments or learning disabilities may also have trouble using federal ITMs, as most do not provide audio output and are not equipped with voice recognition technology.

Many of these ITMs could be made more accessible to people with mobility impairments, such as those who use wheelchairs, simply by moving them to more accessible locations. Most of the other barriers can be more properly addressed by manufacturers during the design process.

While section 508 does not require agencies to retroactively remove barriers (although agencies continue to have nondiscrimination and reasonable accommodation obligations under sections 501 and 504 of the Rehabilitation Act), agencies with inaccessible ITMs should ensure that the programs or services for which nondisabled people use ITMs are accessible to people with disabilities through alternate means.

## The Evaluation Tools

Federal agencies' components were asked to evaluate, both objectively and subjectively, their 10 most widely used ITMs (Information Transaction Machines) for accessibility. The agencies used the "ITM Accessibility Checklist," developed by the Department of Justice, for the objective portion of their survey. Agencies performed a subjective evaluation having users with a wide variety of disabilities test ITMs for accessibility and describe the accessibility successes and problems they encountered during these exercises, including any suggestions for improvement.

Because of anticipated low usage, the Department provided components the opportunity to skip this part of the Component Questionnaire if they did not have any ITMs.

For each of the 10 ITMs evaluated, components were instructed to provide the following identifying and descriptive information:

- Manufacturer
- Model
- Software
- Number of units operated or used by component
- Weekly usage by members of the public and federal employees
- Hours of availability
- Type (chosen from the following list)
    - (a) automated teller machine (ATM)
    - (b) ticket vending machine

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(c) information or computer kiosk
(d) electronic building directory
(e) point-of-sale card payment system
(f) fare machine
(g) other (describe)

Components were then instructed to evaluate each page using both objective and subjective evaluation tools.

Few agencies currently use ITMs, so little information is available. Fifty-nine of the 81 agencies, including 247 of the 289 reporting components, indicated that they do not use ITMs. We received only 82 ITM surveys. ITM use appears to be particularly limited within smaller agencies and those with limited interaction with the public. Because of the small data pool, the Department's analysis and conclusions should only be considered as rough generalizations of the accessibility of ITMs.

## I. Objective Survey Tool: The "ITM Accessibility Checklist"[2]

The "ITM Accessibility Checklist" was based, in part, on the publication "User Needs, and Strategies for Addressing Those Needs" (Trace Guidelines) by the Trace Research and Development Center of the University of Wisconsin-Madison, which can be found at:

http://www.trace.wisc.edu/world/kiosks/itms/needs.html

The development of the Trace Center's publication was funded by the National Institute on Disability and Rehabilitation Research (NIDRR) of the U.S. Department of Education under grant number H133E30012.[3] This Web page also provides useful guidance and explanation for ITMs accessibility. In addition, several questions in the Component Questionnaire are based on the Uniform Federal Accessibility Standards (UFAS), which establish design and construction standards for federal and federally-funded facilities under the Architectural Barriers Act of 1968, 42 U.S.C. §§ 4151 et seq.,[4] and on the ADA Standards for Accessible Design, 28 C.F.R. Pt. 36, Appendix A (ADA Standards), which are design and construction standards for entities subject to titles II and III of the Americans with Disabilities Act, 42 U.S.C. § 12182, et seq.[5]

The "Objective" discussion of ITMs is divided into three subparts:

- *Review of Survey Questions*. This subpart reviews the individual survey questions, providing both an explanation of the question and the results of the components' self-evaluations. Background information is provided for each question that explains the accessibility issues underlying it.
- *Summary of Impact on Disability Categories*. This subpart summarizes, in a chart and accompanying text, how different disability categories are affected by the results of different survey questions.
- *Objective Survey of Accessibility by Disability Category*. This subpart builds on the prior two sections and summarizes the accessibility of federal ITMs, based on components' self-evaluation survey responses.

### *A. Review of Survey Questions*

1. Can the user change sound settings, such as volume?

People who are hard of hearing may need to amplify an ITM's sound volume.

Over half (44 of 82) of the components indicated that the ITMs surveyed do not allow users to change sound settings. It is impossible to determine whether this large percentage indicates a general lack of accessibility of ITMs or whether it reflects the fact that many ITMs do not have any sound output at all. See Table 1.[6]

2. For all visual information and cues, are there simultaneous corresponding audible information and cues?

Most ITMs and other "stand-alone" unattended equipment rely mainly on visual means of conveying information. Obviously, this failure to provide audible information can present problems to people with disabilities affecting vision. It can also affect users with cognitive impairments or learning disabilities if they are unable to read or to discern complicated visual information.

Question 2 asks whether visual information and cues are accompanied by simultaneous corresponding audible information and cues. A "no" answer to Question 2 indicates that barriers exist for blind users. Some people with low vision and those with learning disabilities or cognitive impairments may also face barriers if visual information is not also presented audibly. Audible information can be provided through synthesized or prerecorded speech for visual information appearing on touchscreens, buttons, and all types of visual output. To be effective, people should be able to explore the ITM through activating the auditory labels before making selections.

In 60% (50 of 82) of the surveys, components indicated that the ITMs do not provide audible information and cues corresponding to visual information and cues. See Table 2.

3. Is there sufficient contrast between foreground and background colors or tones so that a person with low vision can use the technology, or is it possible for the user to select foreground and background colors?

4. Is all text information displayed large enough that it can be read by someone with low vision, or is it possible for the user to select an enlarged display?

These closely related questions address the accessibility of information provided by an ITM to people with different kinds of disabilities affecting vision, including low vision and the condition that is commonly referred to as "color blindness." These are based on the Trace Guidelines' recommendation that, "If the user has difficulty seeing the device, let them change the way it looks." The Trace Guidelines explain:

> Text is malleable depending upon the constraints of the visual interface. For example, fonts can be enlarged, changed between serif and sans serif, made white on black or any other color combination. A visual interface may be constrained in the maximum size of the text, the colors that are available, and the clarity (resolution) possible.

Question 3, which relates to use of color, affects usability by users who cannot distinguish colors as well as those who need high contrast or low contrast color combinations. Question 4 relates to the size of the text, which would only affect users with low vision and not those whose only disability is a difficulty distinguishing colors.

In about one-quarter (19 of 82) of the surveys, components indicated that the ITMs potentially exclude some users because they display insufficiently contrasting foreground and background colors and because users are not able to change the color selections. See Table 3. Additionally, in 39% (39% or 32 of 82) of the surveys, components indicated that the ITMs do not provide text large enough for users with low vision to discern and do not allow users to enlarge the display. See Table 4. Almost all of the ITM surveys showed a strong correlation between components' responses to Questions 3 and 4. See Table 5.

5. Can users select speech input?

Providing speech input for a device provides accessibility in a number of different ways; if speech input is not provided, it may affect many people with disabilities. Those who are blind or who have low vision may be excluded if an ITM requires a form of input that relies on vision; relying on speech input is one way to provide usability for such users. Another group of users who may be excluded when speech input is not available are those who lack fine motor skills, have limited reach or strength, or who lack sufficient neuromuscular coordination (e.g., because of tremors) to operate physical input controls. These users may also benefit greatly from allowing speech input. Finally, speech input may assist users with certain learning disabilities and cognitive impairments.

In 80% (66 of 82) of the surveys, components indicated that the ITMs do not permit speech input. Fortunately, the unavailability of speech input generally does not independently exclude any group of users if other accessibility features are provided. Relatively low availability of speech input on federal ITMs may reflect the current state of technology. Because voice recognition technology is swiftly becoming more accurate and affordable, its use in federal ITMs is likely to increase. See Table 6.

6. If speech input is used, is an alternative method available for inputting information, such as typing on a keyboard or scanning printed material, so that someone who cannot speak can use the technology?

While speech input may assist some, others need alternatives such as the ability to use a keyboard or keypad to input information. Question 6 targets issues affecting those users who have difficulty speaking, such as those with speech disabilities and some users who are deaf or hard of hearing.

Because, as noted with respect to Question 5, relatively few federal ITMs permit speech input, users who have difficulty speaking only rarely face the barriers addressed in Question 6. In 16% (13 of 82) of the surveys, components indicated that the ITMs rely exclusively on speech input. See Table 7.

7. For all sound cues and audible information, such as "beeps," are there simultaneous corresponding visual cues and information?

8. Is there a headphone jack to enable the user to use an assistive listening system to access audible information?

These 2 questions focus on an ITM's usability for persons who are deaf or hard of hearing. Where a user cannot hear, the ITM should provide the user with simultaneous visual cues and information for all sound cues and audible information. As the Trace Guidelines state:

> If the user cannot hear the sounds from the device, show the sounds visually.
>
> Any sounds that a device makes can be shown visually, for example by making a display or indicator light flash when a sound is made. Spoken text and sounds can be shown in "caption" form, enabling someone who cannot hear at all to have access to the same information as people who can easily hear.

Users who are hard of hearing may also benefit from visual information and cues, but may not be completely excluded from a lack of visual information and cues (such as where he or she is able to adequately amplify the volume). A "no" answer to Question 7 indicates that the ITM likely excludes users who are deaf and may adversely affect those who are hard of hearing.

In 18% (15 of 82) of the surveys, components indicated that the ITMs do not provide visual cues and information corresponding to sound cues and audible information. See Table 8.

Users who are hard of hearing can often benefit from audible cues and information if they are provided with a tailored means of listening. One important way to accomplish this task is by providing a standard headphone jack, which permits users to use standard headphones or make use of the T-switch[7] technology that is built in to many hearing aids.[8] In addition to amplification, providing a standard headphone jack can assist people who are hard of hearing by giving them an alternative that minimizes distracting background noises.

Installation of a standard headphone jack also provides a private means of listening for people who use audio output, such as those who are blind or who have low vision. For instance, a blind person who uses an ATM may wish to maintain his or her privacy when the ATM audibly "displays" the amount of cash he or she is withdrawing, or account balance information.

A "no" answer to Question 8 indicates that the ITM surveyed contains a barrier to users who are hard of hearing and to those who use audible output and would have a lesser degree of privacy if headphone jacks were not provided. In 71% (58 of 82) of the surveys, components indicated that the ITMs are not equipped with standard headphone jacks. See Table 9.

9. Can users simultaneously change the visual display settings and the sound settings?

This question relates to users who have low vision and who are hard of hearing. A "no" answer to this question likely indicates that such users may not be able to interact with the ITM. In 68% (56 of 82) of the surveys, components indicated that the ITMs do not permit users to simultaneously change the ITMs' visual display settings and sound settings. See Table 10.

10. Can the user read displayed output with a tactile display such as Braille?

Braille tactile displays provide some blind people with the ability to use an ITM.[9] A "no" answer to this question may indicate a barrier to access by some blind users, but can be offset (for blind users who are not also deaf or hard of hearing) by the provision of adequate audible information. In over 85% (70 of 82) of the surveys, components indicated that the ITMs do not provide output with tactile display, such as Braille. See Table 11.

11. Does the technology allow the user to use scanning input?

Scanning input allows different user options to be highlighted in sequence. A user can choose from different options by selecting that option when its button or menu item is highlighted. As explained by the Trace Guidelines, providing scanning input may significantly improve accessibility for persons with physical disabilities:

> If the user can see, but can only use one or two switches for input, let them step around the buttons using scanning
>
> If someone can only use one or two switches (for example if they are paralyzed from the neck down), it is possible to control the interface by having each item highlighted (or said aloud) one by one. When the one that the user wants is highlighted, they can select it using a single switch. With a double switch they can use one switch to advance the highlight, and the other to select. The latter has more flexibility and control, but not everyone can use two switches which is why single switch is available. Note: It is possible to scan using auditory feedback, but it would be more likely that a user would use speech output and a list to interact with the device.

A "no" answer to Question 11 suggests that the device may present barriers to access by a person who has very limited mobility or dexterity.[10] In 82% (67 of 82) of the surveys, components indicated that the ITMs do not provide an option for scanning input. See Table 12.

12. Is the technology manufactured such that it allows a person using a wheelchair to approach the technology, including all controls, dispensers, receptacles, and other operable equipment, with either a forward or parallel approach?

13. Is the technology manufactured so that, if the equipment is properly placed, the highest operable part of controls, dispensers, receptacles, and other operable parts fall within at least one of the following reach ranges?

If a forward approach is required, the maximum high forward reach is 48 inches.

If a side approach is allowed, and the reach is not over an obstruction, the maximum high side reach is 54 inches; if it is over an obstruction which is no more than 24 inches wide and 34 inches high, the maximum high side reach is 46 inches.

14. If electrical and communication system receptacles are provided, are they mounted no less than 15 inches above the floor?

15. Are all controls and operating mechanisms operable with one hand and operable without

tight grasping, pinching, or twisting of the wrist?

16. Is the force required to operate or activate the controls no greater than 5 lbf?

All of these questions are based on requirements for "Controls and Operating Mechanisms," as stated in the Uniform Federal Accessibility Standards (UFAS), which set design and construction standards for federal and federally-funded facilities under the Architectural Barriers Act, 42 U.S.C. §§ 4151 et seq. Each of these requirements affects the usability of ITMs by people with some other types of mobility impairments, such as those who use wheelchairs.

Federal agencies' ITMs generally meet the physical accessibility requirements of these Uniform Federal Accessibility Standards (UFAS). In 34% (28 of 82) of the surveys, components gave a "no" response to 1 or more of these 5 questions. See Table 13.

17. Are instructions and all information for use accessible to and independently usable by persons with vision impairments?

This question is based on section 4.34.5 of the Americans with Disabilities Act Standards for Accessible Design, 28 C.F.R. pt. 36, Appendix A (ADA Standards). These design standards apply to public accommodations and commercial facilities under title III of the Americans with Disabilities Act, 42 U.S.C. § 12182, et seq., and do not directly apply to federal facilities. However, section 4.34.5 is part of the ADA Standards which relates directly to the design and construction of automated teller machines (ATMs), a common type of ITM. Furthermore, the Access Board has proposed amending the standards that apply to federal facilities — the Architectural Barriers Act Guidelines — to include this requirement.

A "no" answer to this question would indicate that the ITM presents barriers to access to people with vision impairments. In 73% (60 of 82) of the surveys, components indicated that the ITMs did not provide instructions in a format that is accessible to and independently usable by persons with vision impairments. See Table 14.

18. Is the technology manufactured in such a way that it can be made detectable to persons with visual impairments who use canes to detect objects in their path?

Note: Objects projecting from walls with their leading edges between 27 in. and 80 in. above the finished floor should protrude no more than 4 in. into walks, halls, corridors, passageways, or aisles. Objects mounted with their leading edges at or below 27 in. above the finished floor may protrude any amount. Free-standing objects mounted on posts or pylons may overhang 12 in. maximum from 27 in. to 80 in. above the ground or finished floor.

People who are blind and many people with significant low vision use canes to detect objects in their path of travel. Question 18 is based on section 4.4 of UFAS, which is designed to ensure that all objects on which a person could injure himself or herself are detectable by the proper use of a cane.

A "no" answer to this question may indicate that the ITM poses a barrier to access by a person who is blind or a person who has low vision. If the ITM is not "cane-detectable," a blind person could walk into it and injure himself or herself.

In 24% (20 of 82) of the surveys, components indicated that the ITMs are not manufactured so that they can be made detectable to people who use canes to detect objects in their path.[11] See Table 15.

### B. Summary of Impact on Disability Categories

The following chart summarizes the survey questions and the disability categories that are affected by responses to those questions:

| | Questions |
|---|---|
| People Who Are Hard of Hearing | Q's 1, 7, and 8 |
| People Who Are Deaf | Q's 6 and 7 |
| People Who Have Low Vision and Who Are Hard of Hearing | Q's 1-5, 7-9, 17, and 18 |
| People Who Are Blind | Q's 2, 5, 10, 17, and 18 |
| People With Color Blindness | Q3 |
| People With Low Vision | Q's 2-5, 17, and 18 |
| People With Speech Disabilities | Q6 |
| People Who Have Tremors or Limited Strength or Dexterity | Q's 5, 11, 15, and 16 |
| People Who Use Wheelchairs | Q's 12-15 |
| People Who Have Cognitive Impairments or Learning Disabilities | Q's 2 and 5 |

## C. Objective Survey of Accessibility by Disability Category

### 1. People Who are Hard of Hearing

Questions 1, 7, and 8 address issues that affect users who are hard of hearing. In 12% (10 of 82) of the surveys, components indicated that the ITMs contain the barriers addressed in all 3 questions. In 82% (67 of 82) of the surveys, components indicated that the ITMs contain at least one of the barriers addressed in these questions. These results suggest that people who are hard of hearing encounter barriers when using a large percentage of federal ITMs. See Table 16.

However, a more careful analysis of this data indicates how different users who are hard of hearing are affected. Certain users may be able to use ITMs through the sound amplification (Question 1) or by the use of visual cues and information (Question 7). In 12% (10 of 82) of the surveys, components indicated that the ITMs contain barriers to use by people who require either sound amplification or the use of visual cues and information. See Table 17.

For other users, sound amplification alone may be insufficient; these users may require either a headphone jack for an assistive listening system (Question 8) or visual cues and information for all audible information (Question 7). In 16% (13 of 82) of the surveys, components indicated that the ITMs entirely exclude users who require either the use of visual cues and information or a headphone jack in which to plug an assistive listening device. See Table 18.

### 2. People Who Are Deaf

Questions 6 and 7 address issues affecting people who are deaf. A "no" response to either Question 6 or Question 7 may exclude deaf users. In 28% (23 of 82) of the surveys, components indicated that the ITMs exclude users who are deaf using these criteria. See Table 19.

### 3. People Who Have Low Vision and Who Are Hard of Hearing

There are a number of questions that address issues affecting users who have low vision and who are hard of hearing. Almost all surveyed ITMs, 96% (79 of 82), do not satisfy at least one of these questions. A more careful analysis of these questions reflects how this diverse group of users is affected. See Table 20.

Some people who have low vision and who are hard of hearing may prefer all information to be conveyed visually to maximize their success of using ITMs. This group of users will require that the features of the ITM meet the needs of a person with low vision (Questions 3, 4, 17, and 18) and that all information conveyed through sounds is also conveyed visually (Question 7). In 79% (65 of 82) of the surveys, components indicated that the ITMs contain barriers for this community. See Table 21.

Other people who are hard of hearing and who have low vision may more readily use information that is conveyed through audible means, due to the severity of their vision impairment, the impracticality of using assistive equipment for visual media in a public setting, or in conjunction with a particular ITM's construction or location. For them, all information that is conveyed visually should also be available audibly. This group of users will require a favorable response to a different subset of questions posed in Table 20 than those users who would favor a visual media. They will require that the features of ITMs meet the needs of a person with low vision (Questions 5, 17, and 18) and that all information conveyed visually is also conveyed through sound (Question 2). Some may be able to rely principally on adjustable sound settings (Question 1). See Table 22. In 94% (77 of 82) of the surveys, components indicated that the ITMs are inaccessible in this regard. By contrast, other users may not be able to rely on adjustable sound settings and may

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require that ITMs are equipped with headphone jacks to allow people to use assistive listening devices (Question 8). See Table 23.

A third group of people includes those whose disabilities affecting vision and hearing are both sufficiently severe that changes in sound and visual settings, even when done simultaneously, cannot provide opportunities for independent access. For them, ITMs should allow people to use keyboard input (Question 6) and tactile displays (Question 10) such as Braille. In addition, instructions and user information should be provided in a format that is accessible to persons with vision impairments (Question 17) and ITMs should be manufactured to be detectable by persons who use canes to detect barriers in their path (Question 18). As a negative response to any of these questions may indicate that the ITMs have significant or insurmountable barriers to people with significant disabilities affecting vision and hearing. See Table 24. In 90% (74 of 82) of the surveys, components indicated that the ITMs are inaccessible in this regard.

### 4. People Who Are Blind

People who are blind require:

- simultaneous and corresponding audible information and cues for all visual information and cues (Question 2);
- instructions and information for user are independently accessible and usable (Question 17); and
- ITMs be manufactured in such a way that they can be made detectable to persons with vision impairments (Question 18).

In 80% (65 of 82) of the surveys, components indicated that the ITMs are inaccessible in these respects. See Table 25.

This large number is compounded by the fact that positive responses to these three questions only provide the most rudimentary form of "access." In addition, permitting speech input (Question 5) and allowing users to use a tactile display (Question 10) would greatly facilitates usability by some blind users. In 95% (78 of 82) of the surveys, components indicated that the ITMs do not incorporate these additional features that would improve access to people who are blind. See Table 26.

### 5. People Who Have Difficulty Discerning Color

To be usable by persons who cannot distinguish certain colors, ITMs should provide sufficient contrast between foreground and background colors or allow users to select their preferred foreground and background colors (Question 3). In 23% (19 of 82) of the surveys, components indicated that the ITMs pose potential barriers to use for this community. See Table 3.

### 6. People with Low Vision

A number of questions affected the usability of ITMs by users with low vision. In 95% (78 of 82) of the surveys, components indicated that the ITMs include one or more barriers to access by users with low vision. See Table 27. A closer analysis of the questions, however, reveals that the actual number of ITM models excluding users with low vision may not be quite as high as this statistic would indicate, because different users with low vision may be able to use an ITM in different ways.

Depending on the severity of a person's vision impairment, among other factors, someone may need or prefer audible information instead of visual information (Question 2). For such users, changing the way that information is displayed visually (Questions 3 and 4) would not be all that helpful. To be usable by this community, ITMs would still have to provide instructions and information that is independently usable and accessible to people with visual impairments (Question 17) and would have to be constructed to be detectable by persons who use canes to detect barriers in their path (Question 18). In 79% (65 of 82) of the surveys, components indicated that the ITMs contain such barriers. See Table 28. These users may also benefit from speech input (Question 5), as well as the features addressed in Questions 2, 3, 4, 17, and 18. In 93% (76 of 82) of the surveys, components noted that the ITMs pose one or more of these potential barriers. See Table 29.

Another group of users with low vision may need or prefer enlarged visual displays or visual displays with sufficient contrast (Questions 3 and 4), instead of audible information (Question 2).

Naturally, to be usable by this community, ITMs must contain information and instructions that are independently usable and accessible to users with low vision (Question 17) and should be detectable to persons who use canes (Question 18). In 78% (64 of 82) of the surveys, components indicated that the ITMs contain barriers to use by this community. See Table 30.

### 7. People with Disabilities Affecting Speech

People with speech disabilities are affected by the issues addressed in Question 6. In 16% (13 of 82) of the surveys, components indicated that the ITMs pose barriers to users with speech disabilities because the ITMs require users to be able to use speech input. See Table 7.

### 8. People with Tremors or Limited Strength or Dexterity

Users with tremors, limited strength, or limited manual dexterity will be affected by the issues raised in Questions 5, 11, 15, and 16. In 93% of the surveys, components indicated that ITMs pose one or more barriers to access by this community. See Table 31.

A more careful analysis of this data, however, may suggest that a smaller group of these users would actually encounter barriers to using federal ITMs. Assuming that a person does not have other disabilities which affect his or her ability to receive information (e.g., an additional hearing or visual impairment), the difficulties encountered by this group of users relates to *inputting* information to ITMs, rather than receiving information *output* from ITMs. Questions 5, 11, 15, and 16 all relate to controls or means of inputting information to ITMs; however, Questions 5 and 11 pertain to two alternative means of providing information input. Question 5 relates to whether ITMs provide a means for speech input by users. Question 11 asks whether ITMs permit scanning input. Each of these alternatives may independently provide access for users within this category. Questions 15 and 16, however, relate to the accessibility of the controls of ITMs. As these controls may include card reader devices or mechanisms for activating an ITM, a positive response to these questions is very important.

Table 32 summarizes the accessibility of ITMs for users who are able to use speech input. In 85% (70 of 82) of the surveys, components indicated that the ITMs pose one or more barriers to this community.

Table 33 summarizes the accessibility of surveyed federal ITMs for users who are capable of using scanning input. In 83% (68 of 82) of the surveys, components indicated that the ITMs pose one or more barriers to this group of users.

### 9. People Who Use Wheelchairs

The issues affecting people who use wheelchairs are slightly different than those of users with other physical disabilities. See Questions 12, 13, and 14. Compared to other disability categories, this group of users is least affected by agencies' ITMs. In 22% of the surveys, components indicated that the ITMs pose potential barriers to people who use wheelchairs. See Table 34.

### 10. People With Learning Disabilities and Cognitive Impairments

Finally, users with learning disabilities and cognitive impairments may encounter barriers when using federal ITMs. A "no" response to Questions 2 or 5 may indicate that the ITMs contain barriers to some people with learning disabilities or cognitive impairments. In 89% (73 of 82) of the surveys, components indicated that the ITMs potentially exclude users with learning disabilities or cognitive impairments in these regards. See Table 35.

## II. Subjective Evaluations of ITMs Accessibility

Components were asked to subjectively evaluate the accessibility of their ITMs to a wide-range of users with differing disabilities. Specifically, the Department directed components with ITMs to do the following:

> After you have evaluated this ITM using the Checklist, have users with a wide variety of disabilities test it for accessibility. Describe the accessibility successes and problems they encountered during these exercises, including any suggestions for improvement.

Question 19, ITM Accessibility Checklist.

Subjective evaluations by components of federal ITMs were rather limited:

- In 13 of the 82 ITM surveys, the ITMs were not evaluated using any subjective means.
- Only 2 ITMs were thoroughly evaluated with users representing a wide range of disabilities.
- In most other cases, components subjectively evaluated the ITMs without the assistance of persons with disabilities or the components sought input from a very limited groups of people with disabilities.
- In 12 of the surveys, components commented that accurate information about the usage of ITMs was unavailable or unobtainable.
- Components reported in 6 of the surveys that access to the ITMs was extremely limited or severely restricted.
- In 5 of the surveys, components reported that the ITMs were owned or maintained by other entities such as banks, credit unions, or other federal agencies.

In 10 of the surveys, components reported that they believed the ITMs are generally accessible or were designed with accessibility in mind. In another 10 of the surveys, components reported that the ITMs are regularly used by users with disabilities without assistance. In 3 surveys, components reported that the ITMs pose some barriers, but the components did not elaborate on the nature of the problems.

Some agencies and their components made specific observations regarding issues that affect users with disabilities. Some entities indicated that they were making their programs (normally delivered through the ITMs) available through alternate means:[12]

- In 3 of the surveys and in 1 overall agency evaluation, entities reported that the services available to nondisabled people on the ITMs were also available through accessible means such as automated telephone services or through the Internet.
- In 6 of the surveys, components reported that the ITMs were located in areas where people with disabilities could receive assistance from employees.
- In 1 of the surveys, a component reported that barriers would be addressed on a case-by-case basis.

Some agencies expressed interest in improving the accessibility of their ITMs or indicated that they were already addressing this issue.

### *Disability-by-Disability Analysis*

People with mobility impairments. For people with mobility impairments, including those who use wheelchairs, agencies and their components made the following findings:

- In 5 of the surveys, components reported that the ITMs were generally located in accessible locations.
- In 5 of the surveys and in 1 overall agency evaluation, entities reported that the ITMs were generally accessible to people who use wheelchairs.
- In 1 ITM survey and 1 overall agency evaluation, agencies reported that the ITMs presented some difficulties for those who use wheelchairs.
- The most common accessibility issue for persons with mobility impairments found in the survey was that the controls and displays of ITMs were too high to be easily usable by someone using a wheelchair.

People who are deaf or hard of hearing. With regard to issues concerning people who are deaf or hard of hearing, agencies and components made the following findings:

- In 2 of the surveys, components found that the ITMs were generally accessible to users who were deaf or hard of hearing.
- No overall agency evaluation commented that ITMs evaluated were

generally accessible to users with hearing impairments.

- In 1 ITM survey and 2 overall agency evaluations, agencies commented on the lack of headphone jacks in their ITMs. These agencies noted that this absence may make it more difficult to use the ITMs by people with hearing impairments.

People with vision impairments, including those who are blind. The group most affected by a lack of accessibility of ITMs are users who have visual impairments, including those who are blind. Agencies and their components made the following specific observations with respect to issues affecting this group:

- In 6 of the surveys and 1 overall agency evaluation, entities reported that the ITMs are generally accessible to blind users and those with vision impairments.
- In 7 of the surveys and 2 overall agency evaluations, entities noted that the ITMs present some or many accessibility problems for blind users and those with vision impairments.
- In 9 of the surveys and 2 overall agency evaluations, entities reported that the ITMs do not provide audible output such as instructions, information, or prompts.
- In 2 of the surveys and 1 overall agency evaluation, entities noted that the ITMs do not provide Braille instructions or output.

## III. Recommendations

None of the federal agencies has outlined an adequate strategy for eliminating barriers to accessibility for their ITMs, even though barriers were identified. The Department recommends agencies take the following steps:

1. Non-Agency-Owned ITMs. Each agency that has facilities or property containing ITMs that are owned or controlled by other entities (including private entities, other federal agencies, or others) should notify them of any barriers to access in their ITMs and recommend that such entities address accessibility issues on a specific time schedule.

2. Location of ITMs. Each agency that has ITMs should ensure that its ITMs are located on accessible routes and are otherwise accessible to people with disabilities such as those who use wheelchairs.

3. Inaccessible ITMs. If an agency's existing ITM is inaccessible or contains inaccessible features, the agency should ensure that whatever information or services the agency provides on the ITM are also available through an accessible and comparably convenient and useful alternate means of access (e.g., automated telephone service or through the Internet). The agency should provide appropriate signage with full instructions regarding use of the accessible alternative method of obtaining information or services.

4. Upgrading Existing ITMs. While section 508 does not generally require retrofitting existing EIT, each agency that replaces or updates an ITM's software or hardware should look for and take advantage of easy opportunities to improve the ITM's accessibility.

5. Instructions. Many times, an ITM contains accessible features, such as a volume control mechanism, but instructions on how to use these features are missing or inadequate. Each agency that has an ITM should survey the ITM and, if appropriate, contact the ITM vendor for a full list of accessible features. The agency should provide clear instructions in accessible formats.

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[1] This document is available on the Department of Justice's section 508 Web site (www.usdoj.gov/crt/508). People with disabilities may request copies in Braille, large print, or on computer disk by calling 1-800-514-0301 (voice) or 1-800-514-0383 (TTY).

[2] Throughout this section, the numbers reflecting components' surveys — and the percentages calculated by the Department of Justice for the purposes of analyzing the accessibility of federal ITMs to persons with disabilities — are raw data that reflect only the number of ITM surveys provided to the Department. They do not reflect the number of ITMs captured by each individual survey (for instance, where multiple ITMs

of the same model were evaluated on a single survey), nor are they weighted by frequency of use. The Department did not receive reliable data on which to perform the necessary calculations.

[3] Use of the Trace Center's materials does not constitute an endorsement of the Trace Center or its work by the Department of Justice. Likewise, the Department of Justice's ITMs Accessibility Checklist has not been adopted, endorsed by, or in any way approved by the Trace Center, NIDRR, or the Department of Education.

[4] The Access Board has proposed amendments to the ABA Guidelines. 64 Fed. Reg. 220 at 62248 (Nov. 16, 1999).

[5] Although the ADA Standards do not apply to federal agencies, they provide useful guidance because they includes specific standards for automated teller machines, a common form of ITMs.

[6] Accompanying this analysis are 3 sets of appendices, which include tables and descriptions of the data provided by the agencies. These ITM Appendices can be summarized as follows:

- *ITM Appendix A* includes the tables specifically mentioned in the text of this Report.
- *ITM Appendix B* includes question-by-question responses to the ITM Accessibility Checklist, organized by type of ITM.
- *ITM Appendix C* includes question-by-question responses to the ITM Accessibility Checklist, organized by agency size.

[7] The T-switch, which is also known as the telecoil, the induction coil, and the induction pick-up coil, is a feature found on some hearing aids that can link the hearing aids to other sources of electromagnetic energy, such as audioloop systems and other types of assistive listening systems.

[8] The Trace Guidelines recommend,

> If the user has difficulty hearing the device, let them change the way it sounds
>
> Sound contains properties that can be altered, such as volume (loudness) and pitch. Modifying these can help users who are unable to hear a device operating normally. In addition, it is possible to directly connect hearing aids to sound sources, providing a better listening system (e.g., a headphone jack connection or telephone hearing aid T-coil connection).

[9] Approximately 10% of people who are blind use Braille.

[10] Any conclusions drawn from components' responses to Question 11 should be tempered by the possible misunderstanding by evaluators of the use of the term "scanning input" in the question. Some evaluators may have mistakenly believed that inquiry went to whether the ITMs contained computer flatbed scanners or Optical Character Recognition (OCR) technology.

[11] Agencies can address this issue simply by placing cane-detectable items (such as posts or permanent planters) on either side of the ITMs, making sure that in doing so they are not creating barriers for other people with disabilities (for instance, the cane-detectable items should not interfere with the ability of a person who uses a wheelchair to approach or use the ITM).

[12] Under sections 501 and 504 of the Rehabilitation Act, agencies must ensure that their programs are accessible to persons with disabilities. When their ITMs have barriers, agencies should ensure that whatever programs or information the agency provides on the ITM is also available through an accessible and comparably convenient useful alternate means (e.g., through an automated telephone service or through the Internet). This will assist agencies in meeting their general nondiscrimination obligations under sections 501 and 504 of the Rehabilitation Act, 29 U.S.C. § 791, 794.

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*ITM Appendix A*[1]

## Data Tables

| Table 1: ITMs Not Allowing Users to Change Sound Settings (Q1) | |
|---|---|
| **Type of Agency** | **Number / Total** |
| Overall (All Agencies) | 44 / 82 |
| Cabinet Level Agencies | 29 / 60 |
| All Large Agencies | 11 / 16 |
| All Medium Agencies | 4 / 6 |
| All Small Agencies | 0 / 0 |
| All Very Small Agencies | 0 / 0 |

| Table 2: ITMs Not Providing Simultaneous Audible Information and Cues for Corresponding Visual Information and Cues (Q2) | |
|---|---|
| **Type of Agency** | **Number / Total** |
| Overall (All Agencies) | 50 / 82 |
| Cabinet Level Agencies | 36 / 60 |
| All Large Agencies | 9 / 16 |
| All Medium Agencies | 5 / 6 |
| All Small Agencies | 0 / 0 |
| All Very Small Agencies | 0 / 0 |

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[1] This document is available on the Department of Justice's section 508 Web site (www.usdoj.gov/crt/508). People with disabilities may request copies in Braille, large print, or on computer disk by calling 1-800-514-0301 (voice) or 1-800-514-0383 (TTY).

| Table 3: ITMs With Insufficient Contrast of Foreground and Background Colors or Without Foreground and Background Colors That Can be Chosen by the User (Q3) | |
|---|---|
| **Type of Agency** | **Number / Total** |
| Overall (All Agencies) | 19 / 82 |
| Cabinet Level Agencies | 16 / 60 |
| All Large Agencies | 3 / 16 |
| All Medium Agencies | 0 / 6 |
| All Small Agencies | 0 / 0 |
| All Very Small Agencies | 0 / 0 |

| Table 4: ITMs With Text that Cannot be Read by Someone with Low Vision (Q4) | |
|---|---|
| **Type of Agency** | **Number / Total** |
| Overall (All Agencies) | 32 / 82 |
| Cabinet Level Agencies | 22 / 60 |
| All Large Agencies | 7 / 16 |
| All Medium Agencies | 3 / 6 |
| All Small Agencies | 0 / 0 |
| All Very Small Agencies | 0 / 0 |

| Table 5: ITMs Potentially Excluding Users Through Choice of Color or Size of Text Displayed (Q3 & Q4) | | | | | | |
|---|---|---|---|---|---|---|
| **Problem Identified** | **Overall** | **Cabinet Agencies** | **Large Agencies** | **Medium Agencies** | **Small Agencies** | **Very Small Agencies** |
| Question 3 (no only) | 19 / 82 | 16 / 60 | 3 / 16 | 0 / 6 | 0 / 0 | 0 / 0 |
| Question 4 (no only) | 32 / 82 | 22 / 60 | 7 / 16 | 3 / 6 | 0 / 0 | 0 / 0 |
| **Surveyed items that did not meet all of these survey questions** | 18 / 82 | 15 / 60 | 3 / 16 | 0 / 6 | 0 / 0 | 0 / 0 |
| **Surveyed items that did not meet one or more of these survey questions** | 33 / 82 | 23 / 60 | 7 / 16 | 3 / 6 | 0 / 0 | 0 / 0 |

| Table 6: ITMs Not Permitting Users to Select Speech Input (Q5) | |
|---|---|
| **Type of Agency** | **Number / Total** |
| Overall (All Agencies) | 66 / 82 |
| Cabinet Level Agencies | 46 / 60 |
| All Large Agencies | 16 / 16 |
| All Medium Agencies | 4 / 6 |
| All Small Agencies | 0 / 0 |
| All Very Small Agencies | 0 / 0 |

| Table 7: ITMs that Rely Exclusively on Speech Input (Q6) | |
|---|---|
| **Type of Agency** | **Number / Total** |
| Overall (All Agencies) | 13 / 82 |
| Cabinet Level Agencies | 8 / 60 |
| All Large Agencies | 4 / 16 |
| All Medium Agencies | 1 / 6 |
| All Small Agencies | 0 / 0 |
| All Very Small Agencies | 0 / 0 |

| Table 8: ITMs Not Providing Visual Cues and Information for Corresponding Sound Cues and Audible Information (Q7) | |
|---|---|
| **Type of Agency** | **Number / Total** |
| Overall (All Agencies) | 15 / 82 |
| Cabinet Level Agencies | 12 / 60 |
| All Large Agencies | 1 / 16 |
| All Medium Agencies | 2 / 6 |
| All Small Agencies | 0 / 0 |
| All Very Small Agencies | 0 / 0 |

| Table 9: ITMs Not Providing Headphone Jacks for Assistive Listening Systems (Q8) | |
|---|---|
| **Type of Agency** | **Number / Total** |
| Overall (All Agencies) | 58 / 82 |
| Cabinet Level Agencies | 43 / 60 |
| All Large Agencies | 12 / 16 |
| All Medium Agencies | 3 / 6 |
| All Small Agencies | 0 / 0 |
| All Very Small Agencies | 0 / 0 |

| Title 10: ITMs Not Allowing Users to Simultaneously Change Visual Display Settings and Sound Settings (Q9) | |
|---|---|
| **Type of Agency** | **Number / Total** |
| Overall (All Agencies) | 56 / 82 |
| Cabinet Level Agencies | 41 / 60 |
| All Large Agencies | 9 / 16 |
| All Medium Agencies | 6 / 6 |
| All Small Agencies | 0 / 0 |
| All Very Small Agencies | 0 / 0 |

| Title 11: ITMs Not Displaying Output with a Tactile Display, such as Braille (Q10) | |
|---|---|
| **Type of Agency** | **Number / Total** |
| Overall (All Agencies) | 70 / 82 |
| Cabinet Level Agencies | 49 / 60 |
| All Large Agencies | 15 / 16 |
| All Medium Agencies | 6 / 6 |
| All Small Agencies | 0 / 0 |
| All Very Small Agencies | 0 / 0 |

| Table 12: ITMs Not Allowing People to Use Scanning Input (Q11) | |
|---|---|
| **Type of Agency** | **Number / Total** |
| Overall (All Agencies) | 67 / 82 |
| Cabinet Level Agencies | 50 / 60 |
| All Large Agencies | 14 / 16 |
| All Medium Agencies | 3 / 6 |
| All Small Agencies | 0 / 0 |
| All Very Small Agencies | 0 / 0 |

**Table 13: ITMs Not Meeting Certain UFAS Accessibility Guidelines (Q12-Q16)**

| Problem Identified | Overall | Cabinet Agencies | Large Agencies | Medium Agencies | Small Agencies | Very Small Agencies |
|---|---|---|---|---|---|---|
| Question 12 (no only) | 9 / 82 | 8 / 60 | 0 / 16 | 1 / 6 | 0 / 0 | 0 / 0 |
| Question 13 (no only) | 10 / 82 | 8 / 60 | 1 / 16 | 1 / 6 | 0 / 0 | 0 / 0 |
| Question 14 (no only) | 8 / 82 | 7 / 60 | 1 / 16 | 0 / 6 | 0 / 0 | 0 / 0 |
| Question 15 (no only) | 3 / 82 | 2 / 60 | 1 / 16 | 0 / 6 | 0 / 0 | 0 / 0 |
| Question 16 (no only) | 12 / 82 | 12 / 60 | 0 / 16 | 0 / 6 | 0 / 0 | 0 / 0 |
| **Surveyed items that did not meet all of these survey questions** | 1 / 82 | 1 / 60 | 0 / 16 | 0 / 6 | 0 / 0 | 0 / 0 |
| **Surveyed items that did not meet one or more of these survey questions** | 28 / 82 | 24 / 60 | 3 / 16 | 1 / 6 | 0 / 0 | 0 / 0 |

**Table 14: ITMs Not Including Instructions and All Information in a Format that is Independently Usable by Persons with Disabilities Affecting Vision (Q17)**

| Type of Agency | Number / Total |
|---|---|
| Overall (All Agencies) | 60 / 82 |
| Cabinet Level Agencies | 42 / 60 |
| All Large Agencies | 12 / 16 |
| All Medium Agencies | 6 / 6 |
| All Small Agencies | 0 / 0 |
| All Very Small Agencies | 0 / 0 |

| Table 15: ITMs that Are Not Detectable to Blind Persons who use Canes to Detect Objects in Their Path (Q18) | |
|---|---|
| **Type of Agency** | **Number / Total** |
| Overall (All Agencies) | 20 / 82 |
| Cabinet Level Agencies | 16 / 60 |
| All Large Agencies | 4 / 16 |
| All Medium Agencies | 0 / 6 |
| All Small Agencies | 0 / 0 |
| All Very Small Agencies | 0 / 0 |

**Table 16: Summary of ITM Accessibility for Users who are Deaf or Hard of Hearing**

| Problem Identified | Overall | Cabinet Agencies | Large Agencies | Medium Agencies | Small Agencies | Very Small Agencies |
|---|---|---|---|---|---|---|
| Que[illegible] 1 (no only) | 44 / 82 | 29 / 60 | 11 / 16 | 4 / 6 | 0 / 0 | 0 / 0 |
| Question 7 (no only) | 15 / 82 | 12 / 60 | 1 / 16 | 2 / 6 | 0 / 0 | 0 / 0 |
| Question 8 (no only) | 58 / 82 | 43 / 60 | 12 / 16 | 3 / 6 | 0 / 0 | 0 / 0 |
| **Surveyed items that did not meet all of these survey questions** | 10 / 82 | 7 / 60 | 1 / 16 | 2 / 6 | 0 / 0 | 0 / 0 |
| **Surveyed items that did not meet one or more of these survey questions** | 67 / 82 | 48 / 60 | 14 / 16 | 5 / 6 | 0 / 0 | 0 / 0 |

| Table 17: Summary of ITM Accessibility for Users Requiring Either Sound Amplification or Visual Cues and Information | | | | | | |
|---|---|---|---|---|---|---|
| **Problem Identified** | **Overall** | **Cabinet Agencies** | **Large Agencies** | **Medium Agencies** | **Small Agencies** | **Very Small Agencies** |
| Question 1 (no only) | 44 / 82 | 29 / 60 | 11 / 16 | 4 / 6 | 0 / 0 | 0 / 0 |
| Question 7 (no only) | 15 / 82 | 12 / 60 | 1 / 16 | 2 / 6 | 0 / 0 | 0 / 0 |
| **Surveyed items that did not meet all of these survey questions** | 10 / 82 | 7 / 60 | 1 / 16 | 2 / 6 | 0 / 0 | 0 / 0 |
| **Surveyed items that did not meet one or more of these survey questions** | 49 / 82 | 34 / 60 | 11 / 16 | 4 / 6 | 0 / 0 | 0 / 0 |

| Table 18: Summary of ITM Accessibility for Users Requiring Either Visual Cues and Information or Headphone Jacks | | | | | | |
|---|---|---|---|---|---|---|
| **Problem Identified** | **Overall** | **Cabinet Agencies** | **Large Agencies** | **Medium Agencies** | **Small Agencies** | **Very Small Agencies** |
| Question 7 (no only) | 15 / 82 | 12 / 60 | 1 / 16 | 2 / 6 | 0 / 0 | 0 / 0 |
| Question 8 (no only) | 58 / 82 | 43 / 60 | 12 / 16 | 3 / 6 | 0 / 0 | 0 / 0 |
| **Surveyed items that did not meet all of these survey questions** | 13 / 82 | 10 / 60 | 1 / 16 | 2 / 6 | 0 / 0 | 0 / 0 |
| **Surveyed items that did not meet one or more of these survey questions** | 60 / 82 | 45 / 60 | 12 / 16 | 3 / 6 | 0 / 0 | 0 / 0 |

| Table 19: Summary of ITM Accessibility for Users Who Are Deaf | | | | | | |
|---|---|---|---|---|---|---|
| **Problem Identified** | **Overall** | **Cabinet Agencies** | **Large Agencies** | **Medium Agencies** | **Small Agencies** | **Very Small Agencies** |
| Question 6 (no only) | 13 / 82 | 8 / 60 | 4 / 16 | 1 / 6 | 0 / 0 | 0 / 0 |
| Question 7 (no only) | 15 / 82 | 12 / 60 | 1 / 16 | 2 / 6 | 0 / 0 | 0 / 0 |
| **Surveyed items that did noted to meet all of these survey questions** | 5 / 82 | 3 / 60 | 1 / 16 | 1 / 6 | 0 / 0 | 0 / 0 |
| **Surveyed items that did not meet one or more of these survey questions** | 23 / 82 | 17 / 60 | 4 / 16 | 2 / 6 | 0 / 0 | 0 / 0 |

**Table 20: ITMs Potentially Excluding Users With Low Vision and Hearing Disabilities**

| **Problem Identified** | **Overall** | **Cabinet Agencies** | **Large Agencies** | **Medium Agencies** | **Small Agencies** | **Very Small Agencies** |
|---|---|---|---|---|---|---|
| Question 1 (no only) | 44 / 82 | 29 / 60 | 11 / 16 | 4 / 6 | 0 / 0 | 0 / 0 |
| Question 2 (no only) | 50 / 82 | 36 / 60 | 9 / 16 | 5 / 6 | 0 / 0 | 0 / 0 |
| Question 3 (no only) | 19 / 82 | 16 / 60 | 3 / 16 | 0 / 6 | 0 / 0 | 0 / 0 |
| Question 4 (no only) | 32 / 82 | 22 / 60 | 7 / 16 | 3 / 6 | 0 / 0 | 0 / 0 |
| Question 5 (no only) | 66 / 82 | 46 / 60 | 16 / 16 | 4 / 6 | 0 / 0 | 0 / 0 |
| Question 7 (no only) | 15 / 82 | 12 / 60 | 1 / 16 | 2 / 6 | 0 / 0 | 0 / 0 |
| Question 8 (no only) | 58 / 82 | 43 / 60 | 12 / 16 | 3 / 6 | 0 / 0 | 0 / 0 |
| Question 9 (no only) | 56 / 82 | 41 / 60 | 9 / 16 | 6 / 6 | 0 / 0 | 0 / 0 |
| Question 17 (no only) | 60 / 82 | 42 / 60 | 12 / 16 | 6 / 6 | 0 / 0 | 0 / 0 |
| Question 18 (no only) | 20 / 82 | 16 / 60 | 4 / 16 | 0 / 6 | 0 / 0 | 0 / 0 |
| **Surveyed items that did not meet all of these survey questions** | 4 / 82 | 4 / 60 | 0 / 16 | 0 / 6 | 0 / 0 | 0 / 0 |
| **Surveyed items that did not meet one or more of these survey questions** | 79 / 82 | 57 / 60 | 16 / 16 | 6 / 6 | 0 / 0 | 0 / 0 |

**Table 21: ITMs Excluding Users with Hearing Disabilities and Low Vision Who Can Rely Principally on Vision**

| Problem Identified | Overall | Cabinet Agencies | Large Agencies | Medium Agencies | Small Agencies | Very Small Agencies |
|---|---|---|---|---|---|---|
| Question 3 (no only) | 19 / 82 | 16 / 60 | 3 / 16 | 0 / 6 | 0 / 0 | 0 / 0 |
| Question 4 (no only) | 32 / 82 | 22 / 60 | 7 / 16 | 3 / 6 | 0 / 0 | 0 / 0 |
| Question 7 (no only) | 15 / 82 | 12 / 60 | 1 / 16 | 2 / 6 | 0 / 0 | 0 / 0 |
| Question 17 (no only) | 60 / 82 | 42 / 60 | 12 / 16 | 6 / 6 | 0 / 0 | 0 / 0 |
| Question 18 (no only) | 20 / 82 | 16 / 60 | 4 / 16 | 0 / 6 | 0 / 0 | 0 / 0 |
| **Surveyed items that did not meet all of these survey questions** | 4 / 82 | 4 / 60 | 0 / 16 | 0 / 6 | 0 / 0 | 0 / 0 |
| **Surveyed items that did not meet one or more of these survey questions** | 65 / 82 | 47 / 60 | 12 / 16 | 6 / 6 | 0 / 0 | 0 / 0 |

**Table 22: ITMs Excluding Users with Hearing Disabilities and Low Vision Who Can Rely Principally on Hearing Through Adjustable Volume and Sound Settings**

| **Problem Identified** | **Overall** | **Cabinet Agencies** | **Large Agencies** | **Medium Agencies** | **Small Agencies** | **Very Small Agencies** |
|---|---|---|---|---|---|---|
| Question 1 (no only) | 44 / 82 | 29 / 60 | 11 / 16 | 4 / 6 | 0 / 0 | 0 / 0 |
| Question 2 (no only) | 50 / 82 | 36 / 60 | 9 / 16 | 5 / 6 | 0 / 0 | 0 / 0 |
| Question 5 (no only) | 66 / 82 | 46 / 60 | 16 / 16 | 4 / 6 | 0 / 0 | 0 / 0 |
| Question 17 (no only) | 60 / 82 | 42 / 60 | 12 / 16 | 6 / 6 | 0 / 0 | 0 / 0 |
| Question 18 (no only) | 20 / 82 | 16 / 60 | 4 / 16 | 0 / 6 | 0 / 0 | 0 / 0 |
| **Surveyed items that did not meet all of these survey questions** | 9 / 82 | 7 / 60 | 2 / 16 | 0 / 6 | 0 / 0 | 0 / 0 |
| **Surveyed items that did not meet one or more of these survey questions** | 77 / 82 | 55 / 60 | 16 / 16 | 6 / 6 | 0 / 0 | 0 / 0 |

**Table 23: ITMs Excluding Users with Hearing Disabilities and Low Vision Who Can Rely Principally on Hearing With Assistive Listening Systems**

| **Problem Identified** | **Overall** | **Cabinet Agencies** | **Large Agencies** | **Medium Agencies** | **Small Agencies** | **Very Small Agencies** |
|---|---|---|---|---|---|---|
| Question 2 (no only) | 50 / 82 | 36 / 60 | 9 / 16 | 5 / 6 | 0 / 0 | 0 / 0 |
| Question 5 (no only) | 66 / 82 | 46 / 60 | 16 / 16 | 4 / 6 | 0 / 0 | 0 / 0 |
| Question 8 (no only) | 58 / 82 | 43 / 60 | 12 / 16 | 3 / 6 | 0 / 0 | 0 / 0 |
| Question 17 (no only) | 60 / 82 | 42 / 60 | 12 / 16 | 6 / 6 | 0 / 0 | 0 / 0 |
| Question 18 (no only) | 20 / 82 | 16 / 60 | 4 / 16 | 0 / 6 | 0 / 0 | 0 / 0 |
| **Surveyed items that did not meet all of these survey questions** | 14 / 82 | 11 / 60 | 3 / 16 | 0 / 6 | 0 / 0 | 0 / 0 |
| **Surveyed items that did not meet one or more of these survey questions** | 76 / 82 | 54 / 60 | 16 / 16 | 6 / 6 | 0 / 0 | 0 / 0 |

**Table 24: ITMs Posing Barriers to Persons with Very Severe Hearing and Visual Disabilities**

| Problem Identified | Overall | Cabinet Agencies | Large Agencies | Medium Agencies | Small Agencies | Very Small Agencies |
|---|---|---|---|---|---|---|
| Question 6 (no only) | 13 / 82 | 8 / 60 | 4 / 16 | 1 / 6 | 0 / 0 | 0 / 0 |
| Question 10 (no only) | 70 / 82 | 49 / 60 | 15 / 16 | 6 / 6 | 0 / 0 | 0 / 0 |
| Question 17 (no only) | 60 / 82 | 42 / 60 | 12 / 16 | 6 / 6 | 0 / 0 | 0 / 0 |
| Question 18 (no only) | 20 / 82 | 16 / 60 | 4 / 16 | 0 / 6 | 0 / 0 | 0 / 0 |
| **Surveyed items that did not meet all of these survey questions** | 3 / 82 | 1 / 60 | 2 / 16 | 0 / 6 | 0 / 0 | 0 / 0 |
| **Surveyed items that did not meet one or more of these survey questions** | 74 / 82 | 53 / 60 | 15 / 16 | 6 / 6 | 0 / 0 | 0 / 0 |

**Table 25: ITMs Containing Fundamental Barriers to Access by Blind Users**

| Problem Identified | Overall | Cabinet Agencies | Large Agencies | Medium Agencies | Small Agencies | Very Small Agencies |
|---|---|---|---|---|---|---|
| Question 2 (no only) | 50 / 82 | 36 / 60 | 9 / 16 | 5 / 6 | 0 / 0 | 0 / 0 |
| Question 17 (no only) | 60 / 82 | 42 / 60 | 12 / 16 | 6 / 6 | 0 / 0 | 0 / 0 |
| Question 18 (no only) | 20 / 82 | 16 / 60 | 4 / 16 | 0 / 6 | 0 / 0 | 0 / 0 |
| **Surveyed items that did not meet all of these survey questions** | 17 / 82 | 14 / 60 | 3 / 16 | 0 / 6 | 0 / 0 | 0 / 0 |
| **Surveyed items that did not meet one or more of these survey questions** | 65 / 82 | 47 / 60 | 12 / 16 | 6 / 6 | 0 / 0 | 0 / 0 |

| **Table 26: ITMs That Are Potentially Accessible by Blind Users** | | | | | | |
|---|---|---|---|---|---|---|
| **Problem Identified** | **Overall** | **Cabinet Agencies** | **Large Agencies** | **Medium Agencies** | **Small Agencies** | **Very Small Agencies** |
| Question 2 (no only) | 50 / 82 | 36 / 60 | 9 / 16 | 5 / 6 | 0 / 0 | 0 / 0 |
| Question 5 (no only) | 66 / 82 | 46 / 60 | 16 / 16 | 4 / 6 | 0 / 0 | 0 / 0 |
| Question 10 (no only) | 70 / 82 | 49 / 60 | 15 / 16 | 6 / 6 | 0 / 0 | 0 / 0 |
| Question 17 (no only) | 60 / 82 | 42 / 60 | 12 / 16 | 6 / 6 | 0 / 0 | 0 / 0 |
| Question 18 (no only) | 20 / 82 | 16 / 60 | 4 / 16 | 0 / 6 | 0 / 0 | 0 / 0 |
| **Surveyed items that did not meet all of these survey questions** | 12 / 82 | 9 / 60 | 3 / 16 | 0 / 6 | 0 / 0 | 0 / 0 |
| **Surveyed items that did not meet one or more of these survey questions** | 78 / 82 | 56 / 60 | 16 / 16 | 6 / 6 | 0 / 0 | 0 / 0 |

| Table 27: ITMs Including Potential Barriers to Users with Low Vision | | | | | | |
|---|---|---|---|---|---|---|
| **Problem Identified** | **Overall** | **Cabinet Agencies** | **Large Agencies** | **Medium Agencies** | **Small Agencies** | **Very Small Agencies** |
| Question 2 (no only) | 50 / 82 | 36 / 60 | 9 / 16 | 5 / 6 | 0 / 0 | 0 / 0 |
| Question 3 (no only) | 19 / 82 | 16 / 60 | 3 / 16 | 0 / 6 | 0 / 0 | 0 / 0 |
| Question 4 (no only) | 32 / 82 | 22 / 60 | 7 / 16 | 3 / 6 | 0 / 0 | 0 / 0 |
| Question 5 (no only) | 66 / 82 | 46 / 60 | 16 / 16 | 4 / 6 | 0 / 0 | 0 / 0 |
| Question 17 (no only) | 60 / 82 | 42 / 60 | 12 / 16 | 6 / 6 | 0 / 0 | 0 / 0 |
| Question 18 (no only) | 20 / 82 | 16 / 60 | 4 / 16 | 0 / 6 | 0 / 0 | 0 / 0 |
| **Surveyed items that did not meet all of these survey questions** | 5 / 82 | 5 / 60 | 0 / 16 | 0 / 6 | 0 / 0 | 0 / 0 |
| **Surveyed items that did not meet one or more of these survey questions** | 78 / 82 | 56 / 60 | 16 / 16 | 6 / 6 | 0 / 0 | 0 / 0 |

**Table 28: ITMs that Pose Barriers to Users with Low Vision Who Need or Prefer Audible Information**

| Problem Identified | Overall | Cabinet Agencies | Large Agencies | Medium Agencies | Small Agencies | Very Small Agencies |
|---|---|---|---|---|---|---|
| Question 2 (no only) | 50 / 82 | 36 / 60 | 9 / 16 | 5 / 6 | 0 / 0 | 0 / 0 |
| Question 17 (no only) | 60 / 82 | 42 / 60 | 12 / 16 | 6 / 6 | 0 / 0 | 0 / 0 |
| Question 18 (no only) | 20 / 82 | 16 / 60 | 4 / 16 | 0 / 6 | 0 / 0 | 0 / 0 |
| **Surveyed items that did not meet all of these survey questions** | 17 / 82 | 14 / 60 | 3 / 16 | 0 / 6 | 0 / 0 | 0 / 0 |
| **Surveyed items that did not meet one or more of these survey questions** | 65 / 82 | 47 / 60 | 12 / 16 | 6 / 6 | 0 / 0 | 0 / 0 |

**Table 29: ITMs that Pose Barriers to Users with Low Vision Who Need or Prefer Audible Information and Speech Input**

| Problem Identified | Overall | Cabinet Agencies | Large Agencies | Medium Agencies | Small Agencies | Very Small Agencies |
|---|---|---|---|---|---|---|
| Question 2 (no only) | 50 / 82 | 36 / 60 | 9 / 16 | 5 / 6 | 0 / 0 | 0 / 0 |
| Question 5 (no only) | 66 / 82 | 46 / 60 | 16 / 16 | 4 / 6 | 0 / 0 | 0 / 0 |
| Question 17 (no only) | 60 / 82 | 42 / 60 | 12 / 16 | 6 / 6 | 0 / 0 | 0 / 0 |
| Question 18 (no only) | 20 / 82 | 16 / 60 | 4 / 16 | 0 / 6 | 0 / 0 | 0 / 0 |
| **Surveyed items that did not meet all of these survey questions** | 15 / 82 | 12 / 60 | 3 / 16 | 0 / 6 | 0 / 0 | 0 / 0 |
| **Surveyed items that did not meet one or more of these survey questions** | 76 / 82 | 54 / 60 | 16 / 16 | 6 / 6 | 0 / 0 | 0 / 0 |

| Table 30: ITMs Affecting Users with Low Vision Who Prefer Enhanced Visual Displays | | | | | | |
|---|---|---|---|---|---|---|
| **Problem Identified** | **Overall** | **Cabinet Agencies** | **Large Agencies** | **Medium Agencies** | **Small Agencies** | **Very Small Agencies** |
| Question 3 (no only) | 19 / 82 | 16 / 60 | 3 / 16 | 0 / 6 | 0 / 0 | 0 / 0 |
| Question 4 (no only) | 32 / 82 | 22 / 60 | 7 / 16 | 3 / 6 | 0 / 0 | 0 / 0 |
| Question 17 (no only) | 60 / 82 | 42 / 60 | 12 / 16 | 6 / 6 | 0 / 0 | 0 / 0 |
| Question 18 (no only) | 20 / 82 | 16 / 60 | 4 / 16 | 0 / 6 | 0 / 0 | 0 / 0 |
| **Surveyed items that did not meet all of these survey questions** | 5 / 82 | 5 / 60 | 0 / 16 | 0 / 6 | 0 / 0 | 0 / 0 |
| **Surveyed items that did not meet one or more of these survey questions** | 64 / 82 | 46 / 60 | 12 / 16 | 6 / 6 | 0 / 0 | 0 / 0 |

| Table 31: ITMs Affecting Users with Tremors or with Limited Strength or Dexterity | | | | | | |
|---|---|---|---|---|---|---|
| **Problem Identified** | **Overall** | **Cabinet Agencies** | **Large Agencies** | **Medium Agencies** | **Small Agencies** | **Very Small Agencies** |
| Question 5 (no only) | 66 / 82 | 46 / 60 | 16 / 16 | 4 / 6 | 0 / 0 | 0 / 0 |
| Question 11 (no only) | 67 / 82 | 50 / 60 | 14 / 16 | 3 / 6 | 0 / 0 | 0 / 0 |
| Question 15 (no only) | 3 / 82 | 2 / 60 | 1 / 16 | 0 / 6 | 0 / 0 | 0 / 0 |
| Question 16 (no only) | 12 / 82 | 12 / 60 | 0 / 16 | 0 / 6 | 0 / 0 | 0 / 0 |
| **Surveyed items that did not meet all of these survey questions** | 1 / 82 | 1 / 60 | 0 / 16 | 0 / 6 | 0 / 0 | 0 / 0 |
| **Surveyed items that did not meet one or more of these survey questions** | 76 / 82 | 55 / 60 | 16 / 16 | 5 / 6 | 0 / 0 | 0 / 0 |

**Table 32: ITMs Affecting Users with Tremors or with Limited Strength or Dexterity Who Are Capable of Using Speech Input**

| Problem Identified | Overall | Cabinet Agencies | Large Agencies | Medium Agencies | Small Agencies | Very Small Agencies |
|---|---|---|---|---|---|---|
| Question 5 (no only) | 66 / 82 | 46 / 60 | 16 / 16 | 4 / 6 | 0 / 0 | 0 / 0 |
| Question 15 (no only) | 3 / 82 | 2 / 60 | 1 / 16 | 0 / 6 | 0 / 0 | 0 / 0 |
| Question 16 (no only) | 12 / 82 | 12 / 60 | 0 / 16 | 0 / 6 | 0 / 0 | 0 / 0 |
| **Surveyed items that did not meet all of these survey questions** | 1 / 82 | 1 / 60 | 0 / 16 | 0 / 6 | 0 / 0 | 0 / 0 |
| **Surveyed items that did not meet one or more of these survey questions** | 70 / 82 | 50 / 60 | 16 / 16 | 4 / 6 | 0 / 0 | 0 / 0 |

| Table 33: ITMs Affecting Users with Tremors or with Limited Strength or Dexterity Who Are Capable of Using Scanning Input | | | | | | |
|---|---|---|---|---|---|---|
| **Problem Identified** | **Overall** | **Cabinet Agencies** | **Large Agencies** | **Medium Agencies** | **Small Agencies** | **Very Small Agencies** |
| Question 11 (no only) | 67 / 82 | 50 / 60 | 14 / 16 | 3 / 6 | 0 / 0 | 0 / 0 |
| Question 15 (no only) | 3 / 82 | 2 / 60 | 1 / 16 | 0 / 6 | 0 / 0 | 0 / 0 |
| Question 16 (no only) | 12 / 82 | 12 / 60 | 0 / 16 | 0 / 6 | 0 / 0 | 0 / 0 |
| **Surveyed items that did not meet all of these survey questions** | 1 / 82 | 1 / 60 | 0 / 16 | 0 / 6 | 0 / 0 | 0 / 0 |
| **Surveyed items that did not meet one or more of these survey questions** | 68 / 82 | 51 / 60 | 14 / 16 | 3 / 6 | 0 / 0 | 0 / 0 |

| Table 34: ITMs Posing Barriers to Users Who use Wheelchairs | | | | | | |
|---|---|---|---|---|---|---|
| **Problem Identified** | **Overall** | **Cabinet Agencies** | **Large Agencies** | **Medium Agencies** | **Small Agencies** | **Very Small Agencies** |
| Question 12 (no only) | 9 / 82 | 8 / 60 | 0 / 16 | 1 / 6 | 0 / 0 | 0 / 0 |
| Question 13 (no only) | 10 / 82 | 8 / 60 | 1 / 16 | 1 / 6 | 0 / 0 | 0 / 0 |
| Question 14 (no only) | 8 / 82 | 7 / 60 | 1 / 16 | 0 / 6 | 0 / 0 | 0 / 0 |
| **Surveyed items that did not meet all of these survey questions** | 2 / 82 | 2 / 60 | 0 / 16 | 0 / 6 | 0 / 0 | 0 / 0 |
| **Surveyed items that did not meet one or more of these survey questions** | 18 / 82 | 15 / 60 | 2 / 16 | 1 / 6 | 0 / 0 | 0 / 0 |

**Table 35: ITMs that May Exclude Users with Cognitive Impairments or Learning Disabilities**

| Problem Identified | Overall | Cabinet Agencies | Large Agencies | Medium Agencies | Small Agencies | Very Small Agencies |
|---|---|---|---|---|---|---|
| Question 2 (no only) | 50 / 82 | 36 / 60 | 9 / 16 | 5 / 6 | 0 / 0 | 0 / 0 |
| Question 5 (no only) | 66 / 82 | 46 / 60 | 16 / 16 | 4 / 6 | 0 / 0 | 0 / 0 |
| **Surveyed items that did not meet all of these survey questions** | 43 / 82 | 30 / 60 | 9 / 16 | 4 / 6 | 0 / 0 | 0 / 0 |
| **Surveyed items that did not meet one or more of these survey questions** | 73 / 82 | 52 / 60 | 16 / 16 | 5 / 6 | 0 / 0 | 0 / 0 |

*ITM Appendix B*[1]

## Question-by-Question Responses to the ITM Accessibility Checklist: Statistics by Type of ITM

**Question 1**: Can users change sound settings, such as volume?

| Type of ITM | Yes | No | Not Applicable |
|---|---|---|---|
| Information or computer kiosk | 10 / 36 (27.8%) | 17 / 36 (47.2%) | 9 / 36 (25%) |
| Automated teller machine (ATM) | 0 / 25 (0%) | 18 / 25 (72%) | 7 / 25 (28%) |
| Point of sale card payment system | 0 / 5 (0%) | 3 / 5 (60%) | 2 / 5 (40%) |
| Other | 2 / 15 (13.3%) | 5 / 15 (33.3%) | 8 / 15 (53.3%) |
| Ticket vending machine | 0 / 1 (0%) | 1 / 1 (100%) | 0 / 1 (0%) |

**Question 2**: For all visual information and cues, are there simultaneous corresponding audible information and cues?

| Type of ITM | Yes | No | Not Applicable |
|---|---|---|---|
| Information or computer kiosk | 7 / 36 (19.4%) | 27 / 36 (75%) | 2 / 36 (5.6%) |
| Automated teller machine (ATM) | 12 / 25 (48%) | 12 / 25 (48%) | 1 / 25 (4%) |
| Point of sale card payment system | 1 / 5 (20%) | 2 / 5 (40%) | 2 / 5 (40%) |
| Other | 3 / 15 (20%) | 8 / 15 (53.3%) | 4 / 15 (26.7%) |
| Ticket vending machine | 0 / 1 (0%) | 1 / 1 (100%) | 0 / 1 (0%) |

**Question 3**: Is there sufficient contrast between foreground and background colors or tones so that a person with low vision can use the technology, or is it possible for the user to select foreground and background colors?

| Type of ITM | Yes | No | Not Applicable |
|---|---|---|---|
| Information or computer kiosk | 24 / 36 (66.7%) | 9 / 36 (25%) | 3 / 36 (8.3%) |
| Automated teller machine (ATM) | 19 / 25 (76%) | 4 / 25 (16%) | 2 / 25 (8%) |
| Point of sale card payment system | 3 / 5 (60%) | 1 / 5 (20%) | 1 / 5 (20%) |
| Other | 6 / 15 (40%) | 4 / 15 (26.7%) | 5 / 15 (33.3%) |
| Ticket vending machine | 0 / 1 (0%) | 1 / 1 (100%) | 0 / 1 (0%) |

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| **Question 4**: Is all text information displayed large enough that it can be read by someone with low vision, or is it possible for the user to select an enlarged display? | | | |
|---|---|---|---|
| **Type of ITM** | **Yes** | **No** | **Not Applicable** |
| Information or computer kiosk | 18 / 36 (50%) | 18 / 36 (50%) | 0 / 36 (0%) |
| Automated teller machine (ATM) | 18 / 25 (72%) | 6 / 25 (24%) | 1 / 25 (4%) |
| Point of sale card payment system | 2 / 5 (40%) | 3 / 5 (60%) | 0 / 5 (0%) |
| Other | 6 / 15 (40%) | 4 / 15 (26.7%) | 5 / 15 (33.3%) |
| Ticket vending machine | 0 / 1 (0%) | 1 / 1 (100%) | 0 / 1 (0%) |

| **Question 5**: Can users select speech input? | | | |
|---|---|---|---|
| **Type of ITM** | **Yes** | **No** | **Not Applicable** |
| Information or computer kiosk | 1 / 36 (2.8%) | 30 / 36 (83.3%) | 5 / 36 (13.9%) |
| Automated teller machine (ATM) | 1 / 25 (4%) | 22 / 25 (88%) | 2 / 25 (8%) |
| Point of sale card payment system | 0 / 5 (0%) | 4 / 5 (80%) | 1 / 5 (20%) |
| Other | 0 / 15 (0%) | 9 / 15 (60%) | 6 / 15 (40%) |
| Ticket vending machine | 0 / 1 (0%) | 1 / 1 (100%) | 0 / 1 (0%) |

| **Question 6**: If speech input is used, is an alternative method available for inputting information, such as typing on a keyboard or scanning printed material, so that someone who cannot speak can use the technology? | | | |
|---|---|---|---|
| **Type of ITM** | **Yes** | **No** | **Not Applicable** |
| Information or computer kiosk | 7 / 36 (19.4%) | 6 / 36 (16.7%) | 23 / 36 (63.9%) |
| Automated teller machine (ATM) | 1 / 25 (4%) | 3 / 25 (12%) | 21 / 25 (84%) |
| Point of sale card payment system | 0 / 5 (0%) | 1 / 5 (20%) | 4 / 5 (80%) |
| Other | 1 / 15 (6.7%) | 2 / 15 (13.3%) | 12 / 15 (80%) |
| Ticket vending machine | 0 / 1 (0%) | 1 / 1 (100%) | 0 / 1 (0%) |

| **Question 7**: For all sounds cues and audible information, such as "beeps," are there simultaneous corresponding visual cues and information? | | | |
|---|---|---|---|
| **Type of ITM** | **Yes** | **No** | **Not Applicable** |
| Information or computer kiosk | 13 / 36 (36.1%) | 10 / 36 (27.8%) | 13 / 36 (36.1%) |
| Automated teller machine (ATM) | 20 / 25 (80%) | 3 / 25 (12%) | 2 / 25 (8%) |
| Point of sale card payment system | 2 / 5 (40%) | 1 / 5 (20%) | 2 / 5 (40%) |
| Other | 5 / 15 (33.3%) | 0 / 15 (0%) | 10 / 15 (66.7%) |
| Ticket vending machine | 0 / 1 (0%) | 1 / 1 (100%) | 0 / 1 (0%) |

**Question 8**: Is there a headphone jack to enable the user to use an assistive listening system to access audible information?

| **Type of ITM** | **Yes** | **No** | **Not Applicable** |
|---|---|---|---|
| Information or computer kiosk | 3 / 36 (8.3%) | 27 / 36 (75%) | 6 / 36 (16.7%) |
| Automated teller machine (ATM) | 0 / 25 (0%) | 21 / 25 (84%) | 4 / 25 (16%) |
| Point of sale card payment system | 0 / 5 (0%) | 3 / 5 (60%) | 2 / 5 (40%) |
| Other | 0 / 15 (0%) | 6 / 15 (40%) | 9 / 15 (60%) |
| Ticket vending machine | 0 / 1 (0%) | 1 / 1 (100%) | 0 / 1 (0%) |

**Question 9**: Can users simultaneously change the visual display settings and the sound settings?

| **Type of ITM** | **Yes** | **No** | **Not Applicable** |
|---|---|---|---|
| Information or computer kiosk | 2 / 36 (5.6%) | 27 / 36 (75%) | 7 / 36 (19.4%) |
| Automated teller machine (ATM) | 0 / 25 (0%) | 19 / 25 (76%) | 6 / 25 (24%) |
| Point of sale card payment system | 0 / 5 (0%) | 3 / 5 (60%) | 2 / 5 (40%) |
| Other | 1 / 15 (6.7%) | 6 / 15 (40%) | 8 / 15 (53.3%) |
| Ticket vending machine | 0 / 1 (0%) | 1 / 1 (100%) | 0 / 1 (0%) |

**Question 10**: Can the user read displayed output with a tactile display such as Braille?

| **Type of ITM** | **Yes** | **No** | **Not Applicable** |
|---|---|---|---|
| Information or computer kiosk | 1 / 36 (2.8%) | 32 / 36 (88.9%) | 3 / 36 (8.3%) |
| Automated teller machine (ATM) | 6 / 25 (24%) | 19 / 25 (76%) | 0 / 25 (0%) |
| Point of sale card payment system | 0 / 5 (0%) | 4 / 5 (80%) | 1 / 5 (20%) |
| Other | 0 / 15 (0%) | 14 / 15 (93.3%) | 1 / 15 (6.7%) |
| Ticket vending machine | 0 / 1 (0%) | 1 / 1 (100%) | 0 / 1 (0%) |

**Question 11**: Does the technology allow the user to use scanning input?

| **Type of ITM** | **Yes** | **No** | **Not Applicable** |
|---|---|---|---|
| Information or computer kiosk | 0 / 36 (0%) | 28 / 36 (77.8%) | 8 / 36 (22.2%) |
| Automated teller machine (ATM) | 0 / 25 (0%) | 22 / 25 (88%) | 3 / 25 (12%) |
| Point of sale card payment system | 0 / 5 (0%) | 4 / 5 (80%) | 1 / 5 (20%) |
| Other | 1 / 15 (6.7%) | 12 / 15 (80%) | 2 / 15 (13.3%) |
| Ticket vending machine | 0 / 1 (0%) | 1 / 1 (100%) | 0 / 1 (0%) |

**Question 12**: Is the technology manufactured such that it allows a person using a wheelchair to approach the technology, including all controls, dispensers, receptacles, and other operable equipment, with either a forward or parallel approach?

| **Type of ITM** | **Yes** | **No** | **Not Applicable** |
|---|---|---|---|
| Information or computer kiosk | 32 / 36 (88.9%) | 4 / 36 (11.1%) | 0 / 36 (0%) |
| Automated teller machine (ATM) | 23 / 25 (92%) | 2 / 25 (8%) | 0 / 25 (0%) |
| Point of sale card payment system | 3 / 5 (60%) | 1 / 5 (20%) | 1 / 5 (20%) |
| Other | 12 / 15 (80%) | 1 / 15 (6.7%) | 2 / 15 (13.3%) |
| Ticket vending machine | 0 / 1 (0%) | 1 / 1 (100%) | 0 / 1 (0%) |

**Question 13**: Is the technology manufactured so that, if the equipment is properly paced, the highest operable part of controls, dispensers, receptacles, and other operable parts fall within at least one of the following reach ranges?

| **Type of ITM** | **Yes** | **No** | **Not Applicable** |
|---|---|---|---|
| Information or computer kiosk | 29 / 36 (80.6%) | 5 / 36 (13.9%) | 2 / 36 (5.6%) |
| Automated teller machine (ATM) | 23 / 25 (92%) | 2 / 25 (8%) | 0 / 25 (0%) |
| Point of sale card payment system | 3 / 5 (60%) | 1 / 5 (20%) | 1 / 5 (20%) |
| Other | 12 / 15 (80%) | 1 / 15 (6.7%) | 2 / 15 (13.3%) |
| Ticket vending machine | 0 / 1 (0%) | 1 / 1 (100%) | 0 / 1 (0%) |

**Question 14**: If electrical and communication system receptacles are provided, are they mounted no less than 15 inches above the floor?

| **Type of ITM** | **Yes** | **No** | **Not Applicable** |
|---|---|---|---|
| Information or computer kiosk | 13 / 36 (36.1%) | 4 / 36 (11.1%) | 19 / 36 (52.8%) |
| Automated teller machine (ATM) | 5 / 25 (20%) | 2 / 25 (8%) | 18 / 25 (72%) |
| Point of sale card payment system | 2 / 5 (40%) | 0 / 5 (0%) | 3 / 5 (60%) |
| Other | 5 / 15 (33.3%) | 1 / 15 (6.7%) | 9 / 15 (60%) |
| Ticket vending machine | 0 / 1 (0%) | 1 / 1 (100%) | 0 / 1 (0%) |

**Question 15**: Are all controls and operating mechanisms operable with one hand and operable without tight grasping, pinching, or twisting of the wrist?

| **Type of ITM** | **Yes** | **No** | **Not Applicable** |
|---|---|---|---|
| Information or computer kiosk | 35 / 36 (97.2%) | 0 / 36 (0%) | 1 / 36 (2.8%) |
| Automated teller machine (ATM) | 24 / 25 (96%) | 1 / 25 (4%) | 0 / 25 (0%) |
| Point of sale card payment system | 5 / 5 (100%) | 0 / 5 (0%) | 0 / 5 (0%) |
| Other | 12 / 15 (80%) | 1 / 15 (6.7%) | 2 / 15 (13.3%) |
| Ticket vending machine | 0 / 1 (0%) | 1 / 1 (100%) | 0 / 1 (0%) |

**Question 16**: Is the force required to operate or activate the controls no greater than 5 lbf?

| Type of ITM | Yes | No | Not Applicable |
|---|---|---|---|
| Information or computer kiosk | 31 / 36 (86.1%) | 3 / 36 (8.3%) | 2 / 36 (5.6%) |
| Automated teller machine (ATM) | 19 / 25 (76%) | 2 / 25 (8%) | 4 / 25 (16%) |
| Point of sale card payment system | 3 / 5 (60%) | 2 / 5 (40%) | 0 / 5 (0%) |
| Other | 9 / 15 (60%) | 4 / 15 (26.7%) | 2 / 15 (13.3%) |
| Ticket vending machine | 0 / 1 (0%) | 1 / 1 (100%) | 0 / 1 (0%) |

**Question 17**: Are instructions and all information for use accessible to and independently usable by persons with disabilities affecting vision?

| Type of ITM | Yes | No | Not Applicable |
|---|---|---|---|
| Information or computer kiosk | 3 / 36 (8.3%) | 30 / 36 (83.3%) | 3 / 36 (8.3%) |
| Automated teller machine (ATM) | 10 / 25 (40%) | 15 / 25 (60%) | 0 / 25 (0%) |
| Point of sale card payment system | 1 / 5 (20%) | 3 / 5 (60%) | 1 / 5 (20%) |
| Other | 1 / 15 (6.7%) | 11 / 15 (73.3%) | 3 / 15 (20%) |
| Ticket vending machine | 0 / 1 (0%) | 1 / 1 (100%) | 0 / 1 (0%) |

**Question 18**: Is the technology manufactured in such a way that it can be made detectable to blind persons who use canes to detect objects in their path?

| Type of ITM | Yes | No | Not Applicable |
|---|---|---|---|
| Information or computer kiosk | 24 / 36 (66.7%) | 9 / 36 (25%) | 3 / 36 (8.3%) |
| Automated teller machine (ATM) | 18 / 25 (72%) | 5 / 25 (20%) | 2 / 25 (8%) |
| Point of sale card payment system | 2 / 5 (40%) | 0 / 5 (0%) | 3 / 5 (60%) |
| Other | 4 / 15 (26.7%) | 5 / 15 (33.3%) | 6 / 15 (40%) |
| Ticket vending machine | 0 / 1 (0%) | 1 / 1 (100%) | 0 / 1 (0%) |

*ITM Appendix C*[1]

## Question-by-Question Responses to the ITM Accessibility Checklist: Statistics by Agency Size

**Question 1**: Can users change sound settings, such as volume?

| **Type of Agency** | **Yes** | **No** | **Not Applicable** | **Total** |
|---|---|---|---|---|
| Overall (All Agencies) | 12 (14.6%) | 44 (53.7%) | 26 (31.7%) | 82 |
| Cabinet Level Agencies | 9 (15%) | 29 (48.3%) | 22 (36.7%) | 60 |
| All Large Agencies | 2 (12.5%) | 11 (68.8%) | 3 (18.8%) | 16 |
| All Medium Agencies | 1 (16.7%) | 4 (66.7%) | 1 (16.7%) | 6 |
| All Small Agencies | 0 | 0 | 0 | 0 |
| All Very Small Agencies | 0 | 0 | 0 | 0 |

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[1] This document is available on the Department of Justice's section 508 Web site (www.usdoj.gov/crt/508). People with disabilities may request copies in Braille, large print, or on computer disk by calling 1-800-514-0301 (voice) or 1-800-514-0383 (TTY).

**Question 2**: For all visual information and cues, are there simultaneous corresponding audible information and cues?

| **Type of Agency** | **Yes** | **No** | **Not Applicable** | **Total** |
|---|---|---|---|---|
| Overall (All Agencies) | 23 (28%) | 50 (61%) | 9 (11%) | 82 |
| Cabinet Level Agencies | 15 (25%) | 36 (60%) | 9 (15%) | 60 |
| All Large Agencies | 7 (43.8%) | 9 (56.3%) | 0 (0%) | 16 |
| All Medium Agencies | 1 (16.7%) | 5 (83.3%) | 0 (0%) | 6 |
| All Small Agencies | 0 | 0 | 0 | 0 |
| All Very Small Agencies | 0 | 0 | 0 | 0 |

**Question 3**: Is there sufficient contrast between foreground and background colors or tones so that a person with low vision can use the technology, or is it possible for the user to select foreground and background colors?

| **Type of Agency** | **Yes** | **No** | **Not Applicable** | **Total** |
|---|---|---|---|---|
| Overall (All Agencies) | 52 (63.4%) | 19 (23.2%) | 11 (13.4%) | 82 |
| Cabinet Level Agencies | 34 (56.7%) | 16 (26.7%) | 10 (16.7%) | 60 |
| All Large Agencies | 12 (75%) | 3 (18.8%) | 1 (6.3%) | 16 |
| All Medium Agencies | 6 (100%) | 0 (0%) | 0 (0%) | 6 |
| All Small Agencies | 0 | 0 | 0 | 0 |
| All Very Small Agencies | 0 | 0 | 0 | 0 |

**Question 4**: Is all text information displayed large enough that it can be read by someone with low vision, or is it possible for the user to select an enlarged display?

| **Type of Agency** | **Yes** | **No** | **Not Applicable** | **Total** |
|---|---|---|---|---|
| Overall (All Agencies) | 44 (53.7%) | 32 (39%) | 6 (7.3%) | 82 |
| Cabinet Level Agencies | 33 (55%) | 22 (36.7%) | 5 (8.3%) | 60 |
| All Large Agencies | 8 (50%) | 7 (43.8%) | 1 (6.3%) | 16 |
| All Medium Agencies | 3 (50%) | 3 (50%) | 0 (0%) | 6 |
| All Small Agencies | 0 | 0 | 0 | 0 |
| All Very Small Agencies | 0 | 0 | 0 | 0 |

**Question 5**: Can users select speech input?

| **Type of Agency** | **Yes** | **No** | **Not Applicable** | **Total** |
|---|---|---|---|---|
| Overall (All Agencies) | 2 (2.4%) | 66 (80.5%) | 14 (17.1%) | 82 |
| Cabinet Level Agencies | 2 (3.3%) | 46 (76.7%) | 12 (20%) | 60 |
| All Large Agencies | 0 (0%) | 16 (100%) | 0 (0%) | 16 |
| All Medium Agencies | 0 (0%) | 4 (66.7%) | 2 (33.3%) | 6 |
| All Small Agencies | 0 | 0 | 0 | 0 |
| All Very Small Agencies | 0 | 0 | 0 | 0 |

| **Question 6**: If speech input is used, is an alternative method available for inputting information, such as typing on a keyboard or scanning printed material, so that someone who cannot speak can use the technology? | | | | |
|---|---|---|---|---|
| **Type of Agency** | **Yes** | **No** | **Not Applicable** | **Total** |
| Overall (All Agencies) | 9 (11%) | 13 (15.9%) | 60 (73.2%) | 82 |
| Cabinet Level Agencies | 8 (13.3%) | 8 (13.3%) | 44 (73.3%) | 60 |
| All Large Agencies | 1 (6.3%) | 4 (25%) | 11 (68.8%) | 16 |
| All Medium Agencies | 0 (0%) | 1 (16.7%) | 5 (83.3%) | 6 |
| All Small Agencies | 0 | 0 | 0 | 0 |
| All Very Small Agencies | 0 | 0 | 0 | 0 |

| **Question 7**: For all sound cues and audible information, such as "beeps," are there simultaneous corresponding visual cues and information? | | | | |
|---|---|---|---|---|
| **Type of Agency** | **Yes** | **No** | **Not Applicable** | **Total** |
| Overall (All Agencies) | 40 (48.8%) | 15 (18.3%) | 27 (32.9%) | 82 |
| Cabinet Level Agencies | 27 (45%) | 12 (20%) | 21 (35%) | 60 |
| All Large Agencies | 12 (75%) | 1 (6.3%) | 3 (18.8%) | 16 |
| All Medium Agencies | 1 (16.7%) | 2 (33.3%) | 3 (50%) | 6 |
| All Small Agencies | 0 | 0 | 0 | 0 |
| All Very Small Agencies | 0 | 0 | 0 | 0 |

**Question 8**: Is there a headphone jack to enable the user to use an assistive listening system to access audible information?

| Type of Agency | Yes | No | Not Applicable | Total |
|---|---|---|---|---|
| Overall (All Agencies) | 3 (3.7%) | 58 (70.7%) | 21 (25.6%) | 82 |
| Cabinet Level Agencies | 3 (5%) | 43 (71.7%) | 14 (23.3%) | 60 |
| All Large Agencies | 0 (0%) | 12 (75%) | 4 (25%) | 16 |
| All Medium Agencies | 0 (0%) | 3 (50%) | 3 (50%) | 6 |
| All Small Agencies | 0 | 0 | 0 | 0 |
| All Very Small Agencies | 0 | 0 | 0 | 0 |

**Question 9**: Can users simultaneously change the visual display settings and the sound settings?

| Type of Agency | Yes | No | Not Applicable | Total |
|---|---|---|---|---|
| Overall (All Agencies) | 3 (3.7%) | 56 (68.3%) | 23 (28%) | 82 |
| Cabinet Level Agencies | 3 (5%) | 41 (68.3%) | 16 (26.7%) | 60 |
| All Large Agencies | 0 (0%) | 9 (56.3%) | 7 (43.8%) | 16 |
| All Medium Agencies | 0 (0%) | 6 (100%) | 0 (0%) | 6 |
| All Small Agencies | 0 | 0 | 0 | 0 |
| All Very Small Agencies | 0 | 0 | 0 | 0 |

| **Question 10**: Can the user read displayed output with a tactile display such as Braille? | | | | |
|---|---|---|---|---|
| **Type of Agency** | **Yes** | **No** | **Not Applicable** | **Total** |
| Overall (All Agencies) | 7 (8.5%) | 70 (85.4%) | 5 (6.1%) | 82 |
| Cabinet Level Agencies | 6 (10%) | 49 (81.7%) | 5 (8.3%) | 60 |
| All Large Agencies | 1 (6.3%) | 15 (93.8%) | 0 (0%) | 16 |
| All Medium Agencies | 0 (0%) | 6 (100%) | 0 (0%) | 6 |
| All Small Agencies | 0 | 0 | 0 | 0 |
| All Very Small Agencies | 0 | 0 | 0 | 0 |

| **Question 11**: Does the technology allow the user to use scanning input? | | | | |
|---|---|---|---|---|
| **Type of Agency** | **Yes** | **No** | **Not Applicable** | **Total** |
| Overall (All Agencies) | 1 (1.2%) | 67 (81.7%) | 14 (17.1%) | 82 |
| Cabinet Level Agencies | 1 (1.7%) | 50 (83.3%) | 9 (15%) | 60 |
| All Large Agencies | 0 (0%) | 14 (87.5%) | 2 (12.5%) | 16 |
| All Medium Agencies | 0 (0%) | 3 (50%) | 3 (50%) | 6 |
| All Small Agencies | 0 | 0 | 0 | 0 |
| All Very Small Agencies | 0 | 0 | 0 | 0 |

**Question 12**: Is the technology manufactured such that it allows a person using a wheelchair to approach the technology, including all controls, dispensers, receptacles, and other operable equipment, with either a forward or parallel approach?

| Type of Agency | Yes | No | Not Applicable | Total |
|---|---|---|---|---|
| Overall (All Agencies) | 70 (85.4%) | 9 (11%) | 3 (3.7%) | 82 |
| Cabinet Level Agencies | 49 (81.7%) | 8 (13.3%) | 3 (5%) | 60 |
| All Large Agencies | 16 (100%) | 0 (0%) | 0 (0%) | 16 |
| All Medium Agencies | 5 (83.3%) | 1 (16.7%) | 0 (0%) | 6 |
| All Small Agencies | 0 | 0 | 0 | 0 |
| All Very Small Agencies | 0 | 0 | 0 | 0 |

**Question 13**: Is the technology manufactured so that, if the equipment is properly placed, the highest operable part of controls, dispensers, receptacles, and other operable parts fall within at least one of the following reach ranges?

| Type of Agency | Yes | No | Not Applicable | Total |
|---|---|---|---|---|
| Overall (All Agencies) | 67 (81.7%) | 10 (12.2%) | 5 (6.1%) | 82 |
| Cabinet Level Agencies | 47 (78.3%) | 8 (13.3%) | 5 (8.3%) | 60 |
| All Large Agencies | 15 (93.8%) | 1 (6.3%) | 0 (0%) | 16 |
| All Medium Agencies | 5 (83.3%) | 1 (16.7%) | 0 (0%) | 6 |
| All Small Agencies | 0 | 0 | 0 | 0 |
| All Very Small Agencies | 0 | 0 | 0 | 0 |

**Question 14**: If electrical and communication system receptacles are provided, are they mounted no less than 15 inches above the floor?

| Type of Agency | Yes | No | Not Applicable | Total |
|---|---|---|---|---|
| Overall (All Agencies) | 25 (30.5%) | 8 (9.8%) | 49 (59.8%) | 82 |
| Cabinet Level Agencies | 21 (35%) | 7 (11.7%) | 32 (53.3%) | 60 |
| All Large Agencies | 3 (18.8%) | 1 (6.3%) | 12 (75%) | 16 |
| All Medium Agencies | 1 (16.7%) | 0 (0%) | 5 (83.3%) | 6 |
| All Small Agencies | 0 | 0 | 0 | 0 |
| All Very Small Agencies | 0 | 0 | 0 | 0 |

**Question 15**: Are all controls and operating mechanisms operable with one hand and operable without tight grasping, pinching, or twisting of the wrist?

| Type of Agency | Yes | No | Not Applicable | Total |
|---|---|---|---|---|
| Overall (All Agencies) | 76 (92.7%) | 3 (3.7%) | 3 (3.7%) | 82 |
| Cabinet Level Agencies | 55 (91.7%) | 2 (3.3%) | 3 (5%) | 60 |
| All Large Agencies | 15 (93.8%) | 1 (6.3%) | 0 (0%) | 16 |
| All Medium Agencies | 6 (100%) | 0 (0%) | 0 (0%) | 6 |
| All Small Agencies | 0 | 0 | 0 | 0 |
| All Very Small Agencies | 0 | 0 | 0 | 0 |

| **Question 16**: Is the force required to operate or activate the controls no greater than 5 lbf? | | | | |
|---|---|---|---|---|
| **Type of Agency** | **Yes** | **No** | **Not Applicable** | **Total** |
| Overall (All Agencies) | 62 (75.6%) | 12 (14.6%) | 8 (9.8%) | 82 |
| Cabinet Level Agencies | 41 (68.3%) | 12 (20%) | 7 (11.7%) | 60 |
| All Large Agencies | 16 (100%) | 0 (0%) | 0 (0%) | 16 |
| All Medium Agencies | 5 (83.3%) | 0 (0%) | 1 (16.7%) | 6 |
| All Small Agencies | 0 | 0 | 0 | 0 |
| All Very Small Agencies | 0 | 0 | 0 | 0 |

| **Question 17**: Are instructions and all information for use accessible to and independently usable by persons with disabilities affecting vision? | | | | |
|---|---|---|---|---|
| **Type of Agency** | **Yes** | **No** | **Not Applicable** | **Total** |
| Overall (All Agencies) | 15 (18.3%) | 60 (73.2%) | 7 (8.5%) | 82 |
| Cabinet Level Agencies | 11 (18.3%) | 42 (70%) | 7 (11.7%) | 60 |
| All Large Agencies | 4 (25%) | 12 (75%) | 0 (0%) | 16 |
| All Medium Agencies | 0 (0%) | 6 (100%) | 0 (0%) | 6 |
| All Small Agencies | 0 | 0 | 0 | 0 |
| All Very Small Agencies | 0 | 0 | 0 | 0 |

**Question 18**: Is the technology manufactured in such a way that it can be made detectable to blind persons who use canes to detect objects in their path?

| **Type of Agency** | **Yes** | **No** | **Not Applicable** | **Total** |
|---|---|---|---|---|
| Overall (All Agencies) | 48 (58.5%) | 20 (24.4%) | 14 (17.1%) | 82 |
| Cabinet Level Agencies | 35 (58.3%) | 16 (26.7%) | 9 (15%) | 60 |
| All Large Agencies | 8 (50%) | 4 (25%) | 4 (25%) | 16 |
| All Medium Agencies | 5 (83.3%) | 0 (0%) | 1 (16.7%) | 6 |
| All Small Agencies | 0 | 0 | 0 | 0 |
| All Very Small Agencies | 0 | 0 | 0 | 0 |

# Fax Machines, Copiers, Printers, and Other IT Office Equipment[1]

Most fax machines, copiers, printers, and other IT office equipment contain barriers to access by people with disabilities. For instance, most copiers give error messages on liquid crystal display (LCD) screens that are generally inaccessible to people who are blind or who have low vision. Many LCD screens are angled so that they are difficult or impossible for people who use wheelchairs to read them. People with other types of disabilities encounter different barriers.

Agencies generally found that when they used IT office equipment that was attached to their computer network, many of these barriers were eliminated. Most networked office equipment is designed to communicate with the user while he or she is at his or her workstation. Desktop computers can be easily equipped with assistive technology, such as screen readers, for people with disabilities.

## The Evaluation Tools

Components of federal agencies were asked to evaluate in terms of accessibility, both objectively and subjectively, their 10 most commonly used items in the category containing fax machines, copiers, printers, and other types of IT office equipment. The components used the "IT Equipment Accessibility Checklist" developed by the Department of Justice for the objective portion of their survey.

For each of the 10 items falling within the category of "Other IT Equipment," components were instructed to provide the following information:

- Type of IT equipment:
  - (a) printer
  - (b) fax machine
  - (c) copier
  - (d) other
- Manufacturer
- Model
- Number of units operated or used by this component
- Weekly usage by members of the public and federal employees
- Hours of availability
  - (a) 24 hours a day, seven days a week
  - (b) normal business hours, weekdays only
  - (c) normal business hours, 7 days a week
  - (d) extended business hours, weekdays only
  - (e) extended business hours, weekdays and some weekend hours

In addition to answering objective-format questions for each item, components were directed to have users with a wide variety of disabilities test the equipment for accessibility, and report on their accessibility challenges and successes. Agencies were also asked to make recommendations for improvements.

### I. Objective Survey Tool: The "IT Equipment Accessibility Checklist"

Many of the concepts in the Department's IT Equipment Accessibility Checklist (Checklist) were drawn from the Americans with Disabilities Act's Standards for Accessible Design (ADA Standards), 36 C.F.R. part 36, Appendix A, as well from other sources. This Checklist was intended to facilitate a quick review of the accessibility of office equipment such as printers, fax machines and copiers, that are commonly used in the modern workplace and were not captured by the accessibility surveys of web pages, software, information transaction machines, or telecommunications products.

To aid the reader, this section is divided into three subparts:

- *Review of Survey Questions*. This section reviews the individual survey questions, providing both an explanation of the question and the results of the components' survey. For each

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question, we also provide background information that assisted us in developing the question and that may be used for further research by the interested reader.

- *Summary of Impact on Disability Categories*. This section summarizes, in a chart and accompanying text, how different disability categories are affected by the results of different survey questions.
- *Objective Survey of Accessibility by Disability Category*. This section builds on the prior two sections and summarizes the accessibility of federal IT equipment based on the survey answers provided by components.

### A. Review of Survey Questions

1. Can the user change sound settings, such as volume?

Question 1 of the IT Equipment Accessibility Checklist mirrors Question 1 of the ITM Accessibility Checklist. Both are based on the work of the Trace Research and Development Center of the University of Wisconsin-Madison. People who are hard of hearing frequently may need sound amplification to use all features of IT office equipment. People who are hard of hearing and who have other disabilities may also be excluded if the IT office equipment does not allow the user to change sound settings.

Because some IT equipment may not emit sounds as information to the user, an answer of "not applicable" does not necessarily indicate a problem with accessibility.[1] In 25% (380 of 1,498) of the surveys, components indicated that the IT equipment does not have adjustable sound settings. See Table 1.

2. Are any displays — including liquid crystal displays — readable by persons who are in a seated position, such as those who use wheelchairs?

Question 2 reflects the practical need for allowing persons who use wheelchairs to be able to see the information displayed by the IT equipment. For instance, some large, free-standing office copier machines use flat panel displays that are parallel to the ground. The information conveyed through the display may be unreadable to persons who use wheelchairs, especially if the display uses liquid crystal displays.

Since it is possible (although unlikely) that an item of IT equipment being evaluated does not have a display, an answer of "not applicable" may not necessarily indicate a problem with accessibility. In 16% (240 of 1,498) of the surveys, components indicated that features on the IT equipment cannot be read by seated users, including those who use wheelchairs. See Table 2.

3. For free-standing equipment, is the highest operable part of controls, dispensers, receptacles, and other operable equipment placed within at least one of the following reach ranges?

(a) If a forward approach is required, the maximum high forward reach is 48 inches.

(b) If a side approach is allowed, and the reach is not over an obstruction, the maximum high side reach is 54 inches; if it is over an obstruction which is no more than 24 inches wide and 34 inches high, the maximum high side reach is 46 inches.

Question 3 is drawn from the Uniform Federal Accessibility Standards (UFAS), which apply to federal facilities under the Architectural Barriers Act. 42 U.S.C. §§ 4151 et seq. The ADA Standards contain identical requirements. See ADA Standards §§ 4.2.5 and 4.2.6.

Free-standing EIT equipment, particularly large office copiers, can present a host of accessibility problems for persons who use wheelchairs. Unlike portable office equipment, which can be moved to different locations to facilitate access by persons using wheelchairs, free-standing equipment is usually placed in a fixed location. If the design of that equipment incorporates elements that are too high, it may be inaccessible to a person who uses a wheelchair.

Where modern EIT equipment is portable and not free-standing, a response of "not applicable" is acceptable without affecting accessibility. In 8% (116 of 1,498) of the surveys, components indicated that the IT equipment includes operating controls that are outside the allowable reach ranges. See Table 3.

4. Are status information and cues that are provided in a visual manner also available in an audible manner for persons with visual impairments?

Question 4 of the IT Equipment Accessibility Checklist mirrors Question 2 of the ITM Accessibility Checklist. Both are based on the truism that visual information may be ineffective for users who are blind or who have low vision or other disabilities affecting vision. Some persons with cognitive impairments or learning disabilities may also be affected by the sole reliance on visual information, especially those who cannot read or discern complicated visual information.

Because certain IT equipment may not provide any visual display of information, a "not applicable" response by a component does not necessarily indicate a problem with the equipment's accessibility. In 77% (1,159 of 1,498) of the surveys, components indicated that the IT equipment models do not provide visual status information and cues in an audible format as well as through visual means. See Table 4.

5. For fax machines, does the machine provide line status information (such as notifying the user of a "busy" fax line) in a visual manner (either text display or status lights) for users who are deaf or hard of hearing?

Question 5 of the IT Equipment Accessibility Checklist mirrors Question 7 of the ITM Accessibility Checklist. These questions relate to a user's ability to hear; both ask whether visual information is provided for all audible information. It is important to provide visual cues and information for all sound cues and audible information to make IT equipment accessible to people who are deaf or hard of hearing.

Because Question 5 is limited to fax machines and does not relate to other forms of IT equipment, a response of "not applicable" has no bearing on accessibility. In less than 5% (69 of 1,498) of the surveys, components indicated that the fax machines do not provide visual displays for all information. This percentage reflects the total number of surveys of IT office equipment, not the total number of surveys of fax machines. See Table 5.

6. Is the force required to operate or activate controls no greater than 5 lbf?

Question 6 relates to whether the equipment requires the user to expend a large amount of force to activate or operate its controls. If so, a barrier may exist for people with disabilities limiting strength or manual dexterity. Question 6 was drawn from provisions in UFAS and the ADA Standards.

Because all types of commonly used office EIT equipment use some combination of switches or controls (at the very least, an "on/off" switch), a "not applicable" answer indicates that the evaluator likely misread or misunderstood the question, had no instrument to measure force, or that he or she was trying to avoid choosing the "inaccessible" answer.[2] Therefore, the Department considered the "yes" answers to be more accurate than the "no" answers or than the "no" answers combined with the "not applicable" responses. In 75% (1,117 of 1,498) of the surveys, components indicated that the IT equipment has operating mechanisms that does not require more than 5 pounds of force to operate. See Table 6.

7. Can users confirm their selections?

For instance, if a person has limited fine motor control, such as a person who has a palsy, it is helpful for him or her to have the opportunity to confirm selections — such as "number of copies" selected — before the operation begins.

Modern office equipment often allows the user to choose among a variety of functions. A copier may include options for collating copies, making double-sided copies, and making multiple copies. For a person with limited dexterity or motor control, this complexity may change what would otherwise be a relatively simple task — such as copying — into a difficult task if he or she inadvertently hits the wrong button. One way to lessen the likelihood of mistakes is to allow users to confirm their selections before performing a task.[3] Persons with cognitive impairments or some learning disabilities may also benefit from the ability to review selections before operations begin.

Certain types of office equipment, however, may not be intended for users to make selections. A printer, for instance, may be configured to respond to "print" requests from users on a computer network. Individual users may have no reason to make selections on the unit itself. Therefore, a "not applicable" response may be appropriate without reflecting on the accessibility of the unit reviewed. In 13% (192 of 1,498) of the surveys, components indicated that the IT equipment does not allow users to confirm their selections. See Table 7.

8. Are controls and operating mechanisms operable with one hand and operable without tight grasping, pinching, or twisting of the wrist?

Question 8 addresses another issue that may affect usability of IT equipment for persons with limited strength or manual dexterity. It is based on similar language in UFAS and the ADA Standards.

As previously noted, all or almost all IT equipment has operating mechanisms or controls. Therefore, responses of "not applicable" are analyzed as though they were "no" answers. In close to 10% (144 of 1,498) of the surveys, components indicated that the IT equipment includes operating mechanisms that require tight grasping, twisting, or pinching, thus posing barriers for people with disabilities affecting strength or manual dexterity. See Table 8.

9. Is there a headphone jack for accessing information by users of assistive listening systems?

Question 9 mirrors Question 8 of the ITM Accessibility Checklist. Many users who are hard of hearing may require a tailored means of listening (such as through assistive technologies). For office equipment that uses audible cues or information, providing a standard headphone jack (which permits users to use standard headphones, T-coil connections, or other types of assistive technology) can be a practical way of improving access. A particular item of IT equipment can be accessible to people who are deaf or hard of hearing if all audible information is also provided in a visual format (see Question 5). However, absence of a headphone jack or other means of using assistive technology is particularly significant to people who are both hard of hearing and who are blind or who have low vision.

If IT equipment does not provide any audible information, one might conclude that "not applicable" could be an appropriate response to Question 9. So long as the equipment provides visual information to users, it should provide the same information in an audible format for persons who cannot see. Therefore, the only appropriate answer to Question 9 is "yes" or "no." All "not applicable" responses have been treated as potentially indicating a problem with accessibility. In 94% (1,409 of 1,498) of the surveys, components indicated that the IT equipment does not include a headphone jack. See Table 9.

10. Are instructions and all information for use accessible to and independently usable by persons with vision impairments, such as with recorded information or Braille labels and directions?

User instructions should be available in multiple formats so that they will be usable by everyone. Users who are blind and some with low vision may require instructions to be available in an audible format. When the equipment is designed for use with computers, providing instructions in a computerized format will generally provide accessibility, as those who need information to be presented audibly or in Braille can access it with screen readers. Other types of IT equipment may not be intended to always be used in conjunction with computers and may be deployed where computers are unavailable. Electronic format instructions will be of little use in this circumstance.

> Ex: A ranger station in a national park may have a telephone (or cellular phone) and a fax machine, but not a computer. In these situations, having instructions and documentation available in an electronic format may not be a practical means of making such information accessible to and independently usable by people who are blind or have low vision. .

When IT equipment is not made accessible through providing information in an electronic format, having the information available audibly or in Braille (preferably, in both formats) may be needed to make the instructions available to everyone.[4]

A "not applicable" response may be appropriate if user information is unavailable or not provided to anyone. While user information is unavailable only in rare circumstances, and is only likely to occur with very old equipment, some components may have appropriately selected the "not applicable" response to Question 10; such responses were not deeded to reflect negatively on the accessibility of the equipment surveyed. In 86% (1,285 of 1,498) of the surveys, components indicated that the IT equipment does not have instructions that are independently accessible to users who are blind or who have low vision. See Table 10.

11. Are there alternate operating mechanisms for persons who cannot use push-style controls?

> Ex. For instance, are there alternative methods of control — such as voice activation — for routine tasks?

Question 11 asks whether the IT equipment is accessible to them.

Many types of modern office equipment use push-button controls, often integrated into a single panel. Some people have disabilities that make it impossible for them to use push-style controls. Other machines use "touch-sensitive" display panels. Both of these operating mechanisms are difficult (or impossible) for people who are blind, those with low vision, and some people with disabilities affecting mobility or dexterity. Providing an option to enable users to activate and control the equipment's operations through voice input can make office equipment accessible to many people who would not otherwise be able to use it without assistance.

Although it is unlikely that a particular item of IT equipment will not have operating mechanisms, it is possible that the only controls are basic controls such as a power switch. Designers should think about replacement or supplementation of such basic maintenance controls with alternate forms of input during the early stages of the design process rather than trying to retrofit existing equipment. A "not applicable" response may be appropriate without adversely affecting the item's accessibility rating for the purposes of this Report. In 83% (1,248 of 1,498) of the surveys, components indicated that the IT equipment does not include alternate operating mechanisms for users who cannot use push-style controls. See Table 11.

### B. Summary of Impact on Disability Categories

The following chart summarizes the survey questions and the disability categories that are affected by responses to those questions:

| Affecting the community of users who | Questions | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| are hard of hearing | x | | | | x | | | | x | | |
| are deaf | | | | | x | | | | | | |
| have combined disabilities affecting hearing and vision | x | | | x | x | | | | x | x | x |
| are blind | | | | x | | | | | | x | x |
| have low vision | | | | x | | | | | | x | x |
| have tremors or limited strength or dexterity | | | | | | x | x | x | | | x |
| have some form of a cognitive impairment or learning disability | | | | x | | | x | | | | x |
| use wheelchairs | | x | x | | | | | | | | |

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### C. Objective Survey of Accessibility by Disability Category

The chart above provides a summary of the how answers to the IT Office Equipment Accessibility Checklist would affect different communities of users with disabilities. Different individuals within each community may find different features important for accessibility.

#### 1. Users Who are Deaf or Hard of Hearing

Questions 1, 5, and 9 address accessibility issues that affect users who are hard of hearing. In 1.7% (25 of 1,498) of the surveys, components indicated that the IT equipment does not provide accessibility in all three areas. In 94% (1,415 of 1,498) of the surveys, components indicated that the IT equipment does not provide accessibility in at least one of these areas. See Table 12.

#### 2. Users Who are Deaf

Question 5 is the only question which addresses an accessibility issue for IT office equipment for people who are deaf. The question is limited to fax machines, because relatively few other types of IT office equipment rely on sound as the sole method of conveying important status information or cues to users. In 5% (69 of 1,498) of the surveys, components indicated that the fax machines do not provide a visual means of conveying information that is otherwise presented audibly. See Table 5.

#### 3. Users Who Have Disabilities Affecting Both Vision and Hearing

Six questions (Questions 1, 4-5, and 9-11) address issues that affect usability by users with some combination of both hearing and visual disabilities. In less than 2% (22 of 1,498) of the surveys, components indicated that the IT equipment is inaccessible as measured by all six questions. In less than 99% (1,477 of 1,498) of the surveys, components indicated that the IT equipment is inaccessible in at least one of these respects. See Table 13.

It is also important to determine how different subgroups of users with combinations of disabilities are affected by the issues raised in these questions. Each of the following four subgroups of users is affected by a different subset of these six questions, as shown in the following chart:

| Community of Users | Questions Affecting This Subgroup of Users |
|---|---|
| People who are hard of hearing and blind | 1, 4, 9, 10, 11 |
| People who are hard of hearing and who have low vision | 1, 4, 5, 9, 10, 11 |
| People who are deaf and blind | 10, 11 |
| People who are deaf and who have low vision | 5, 10, 11 |

People who are hard of hearing and blind are affected by issues raised in Questions 1, 4, 9, 10, and 11. In 21.3% (319 of 1,498) of the surveys, components indicated that the IT equipment is inaccessible in all of the areas touched upon by these questions. In 98.6% (1,477 of 1,498) of the surveys, components indicated that the IT equipment includes at least one of these potential barriers to this community of users with disabilities. See Table 14.

People who are hard of hearing and who have low vision are affected by issues raised in all six questions. See Table 13.

People who are both deaf and blind, by contrast, are affected by issues raised in Questions 10 and 11. In 81.1% (1215 of 1,498) of the surveys, components indicated that the IT equipment is inaccessible in both of the areas touched upon by these questions. In 88% (1,318 of 1,498) of the surveys, components indicated that the IT equipment has at least one barrier to this community of users. See Table 15.

Finally, people who are deaf and who have low vision are affected by issues raised in Questions 5, 10, and 11. In 4% (65 of 1,498) of the surveys, components indicated that the IT equipment is inaccessible to this community of users in all three respects; 88% (1,320 of 1,498) indicated that the IT equipment poses at least one potential barrier to this community of users. See Table 16.

#### 4. Users Who Are Blind or Who Have Low Vision

Questions 4, 10, and 11 raise issues that affect people who are blind or who have low vision. In

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71% (1,059 of 1,498) of the surveys, components indicated that the IT equipment poses barriers in all three areas raised by these questions. In 90% (1,349 of 1,498) of the surveys, components indicated that the IT equipment poses at least one potential barrier for this community of users. See Table 17.

### 5. Users Who Have Tremors and Those with Disabilities Limiting Strength or Manual Dexterity

People who have tremors or disabilities limiting strength or manual dexterity are affected by the issues raised in Questions 6-8 and 11. In 1.5% (22 of 1,498) of the surveys, components indicated that the IT equipment poses barriers in all four of the areas touched upon by these questions. In 87.6% (1,316 of 1,498) of the surveys, components indicated that the IT equipment poses at least one potential barrier for this community of users. See Table 18.

Barriers to this community can be further analyzed by creating more subtle distinctions among the disability categories:

| Categories | Questions Affecting Each Subgroup of Users |
|---|---|
| People with tremors or who have limited manual dexterity | 7, 8, 11 |
| People with limited strength | 6, 8 |

People who have tremors or who have limited manual dexterity are affected by issues raised in Questions 7, 8, and 11. In 2.3% (35 of 1,498) of the surveys, components indicated that the IT equipment is inaccessible in all three areas raised by these questions. In 86.6% (1,297 of 1,498) of the surveys, components indicated that the IT equipment poses at least one potential barrier to this community. See Table 19.

People with disabilities limiting strength are affected by issues raised in Questions 6 and 8. In 5.5% (83 of 1,498) of the surveys, components indicated that the IT equipment is inaccessible with respect to the issues raised in both questions. Furthermore, in 29.5% (442 of 1,498) of the surveys, components indicated that the IT equipment is inaccessible in at least one of these respects. See Table 20.

### 6. People with Cognitive Impairments or Learning Disabilities

People with cognitive impairments and learning disabilities are affected by issues raised in Questions 4, 7, and 11. In 12% (173 of 1,498) of the surveys, components indicated that the IT equipment is inaccessible in all three areas raised by these questions. In addition, in 89% (1,336 of 1,498) of the surveys, components indicated that the IT equipment is inaccessible in at least one of these three respects to some persons with cognitive impairments and learning disabilities. See Table 21.

### 7. People who use wheelchairs

Persons who use wheelchairs are affected by issues raised in Questions 2 and 3. In 4% (63 of 1,498) of the surveys, components indicated that the IT equipment contains barriers addressed in both questions. In 19% (293 of 1,498) of the surveys, components indicated that the IT equipment contains at least one potential barrier to people who use wheelchairs. See Table 22.

## II. Subjective Evaluations

The IT Equipment Accessibility Checklist also contained instructions to carry out a more subjective evaluation:

> Question 12. After you have evaluated this equipment using the Checklist, have users with a wide variety of disabilities test it for accessibility. Describe the accessibility successes and problems they encountered during these exercises, as well as your plans for addressing any problems.

Components' answers to Question 12, combined with the narrative overall agency reports, provided a wealth of information. Particularly useful were descriptions of current model programs and agencies' recommendations for making IT equipment more accessible.

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Approximately two-thirds of component surveys of IT office equipment contained meaningful responses to Question 12.

- In 78 surveys, components indicated that the equipment posed no barriers to people with disabilities.
- In 153 surveys, components clearly stated that the equipment posed one or more barriers to people with disabilities.
- Most components to address the issue found that users who were blind or who had low vision were those most likely to encounter barriers to access when using IT office equipment.
- Others found that their IT equipment had controls or displays that were not readable by persons who use wheelchairs.
- Sixty surveys indicated that it would be impossible for many people with disabilities to perform basic maintenance functions (e.g., changing toner cartridges, adding paper, or clearing paper jams in printers, fax machines, and copiers).
- In only 57 surveys did components find that almost all of the equipment's functions were completely unusable or posed tremendous barriers to persons with disabilities.
- In 71 surveys, components noted that current equipment posed no barriers for disabled employees: some of these came from components who volunteered that they did not currently have any employees with disabilities.

Many of the surveys contained comments that indicate there is still some confusion regarding agencies' different legal obligations under sections 501 and 504 of the Rehabilitation Act, compared to those in section 508:

- In 154 surveys, components indicated that they address IT equipment accessibility problems on an ad hoc basis.
- In some instances, components noted that they had no intention of addressing the accessibility of their IT office equipment until a request for a reasonable accommodation was made by a person with a disability. For some, they explained that this policy was one of long-standing within their agency. Other agencies explained that the particular needs of individuals with disabilities were specific to the individual and, consequently, required the agency to wait and consider accommodations on a case-by-case basis.
- In 71 surveys, agencies explained that there were no barriers to using the equipment because support staff was available to provide assistance.

Agencies should separate the reasonable accommodation issue of sections 501/504 from the 508 issue of examining their IT office equipment for general accessibility to persons with disabilities. These legal obligations are not inconsistent. For instance, section 508 requires that agencies procure information technology that is consistent with the Section 508 Standards ultimately promulgated by the Access Board, unless doing so imposes an undue burden. Even when agencies have complied with the Section 508 Standards, if a qualified person with a disability has needs that go beyond those addressed by the Section 508 Standards, and if a reasonable accommodation can be made without imposing an undue burden or fundamentally altering the agency's program, the agency must provide that reasonable accommodation. As the federal environment becomes more reliant on technology, agencies that do not comply with section 508 will find it more difficult to meet their reasonable accommodation obligations under sections 501 and 504 of the Rehabilitation Act. Agencies cannot continue to rely on their ability to provide accommodations on an ad hoc basis. Instead, they must now consider accessibility whenever they develop, procure, maintain, or use electronic and information technology.

Many agencies indicated that it was difficult or impossible to subjectively evaluate their IT office equipment:

- In 242 of the 413 surveys in which components indicated that no testing was done, components also noted that they did not have any employees with disabilities.[5]

- While they did not consult with persons with disabilities, several nondisabled testers showed creativity and tried to test the equipment's accessibility while "simulating" the experience of persons with disabilities. Evaluators would see if equipment was usable with their eyes closed (to simulate blindness) or from a seated position (to simulate a mobility impairment). While these exercises are useful for increasing consciousness of disability accessibility issues, they cannot, however, fully address all of the accessibility issues. That is, if a tester closes his or her eyes to see if a fax machine is usable, Braille lettering or raised nibs on the keypad may appear unusable even though these factors may, in fact, greatly increase the extent to which the equipment is usable by someone who is blind and who uses Braille. It would also be difficult for a nondisabled tester to replicate the experiences of people who use wheelchairs and who have very limited upper body strength.

However, many agencies are showing leadership and creativity in assessing and addressing the accessibility of their IT office technology equipment (and other types of EIT):

- In 14 surveys, agencies acknowledged the participation of intra-agency committees representing the interests of employees with disabilities. For larger agencies that have employees who represent a broad spectrum of disabilities, this approach may prove to be excellent. Components can then draw upon the expertise and opinions developed within these committees. For many of these larger agencies, information flowing from these committees — to the extent that doing so does not raise any security or confidentiality concerns — can and should be made available to other agencies.
- The response of one component, the Mine Safety and Health Administration at the Department of Labor, stated its intention to form multiple "partnerships" with associations representing disability groups that could provide testing services for the component. This commitment is reflected also in the Department of Labor's overall agency report, which is highlighted, below, as a "Promising Practice" and a model on which other agencies can build.

Only 29 of the overall agency reports addressed IT office equipment accessibility, generally reflecting the same concerns raised in the component surveys. In 19 of these reports, agencies acknowledged the existence of some accessibility difficulties with their IT office equipment. Some of the more specific observations included:

- Portable equipment was sometimes located in inaccessible locations.
- Some IT office equipment simply lacked the features (such as easily readable displays and voice output) that would have permitted many people with disabilities to use the equipment independently.

More importantly, the response from the Department of Labor reflected a very positive commitment to improving accessibility. This statement of an agency's commitment, which appears below, should be a model for other agencies.

## III. Recommendations

To address the barriers discussed in this Report, the Department recommends the following:

1. Instructions. Many times, office machines contain accessible features, such as a volume control mechanism on a fax machine, but instructions on how to use these features are missing or inadequate. Each agency should survey its fax machines, copiers, and printers and, if appropriate, contact vendors for a full list of accessible features. The agency should provide clear instructions in accessible formats.

2. Networked IT Office Equipment. The extent to which copiers and fax machines are accessible is greatly enhanced when the user can send commands from an attached desktop computer terminal (such terminals may be easily outfitted with the appropriate assistive technology to meet an individual's needs). Each agency should, in appropriate circumstances, seek out network solutions over stand-alone machines when such solutions would provide a greater degree of accessibility for employees and members of the public with disabilities.

3. Instructions for Alternatives. For inaccessible IT office equipment that is available to the general public or a large number of employees, each agency should ensure that accessible instructions are available on how a person with a disability can obtain accessible alternative services (such as where to seek assistance).

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[1] This document is available on the Department of Justice's section 508 Web site (www.usdoj.gov/crt/508). People with disabilities may request copies in Braille, large print, or on computer disk by calling 1-800-514-0301 (voice) or 1-800-514-0383 (TTY).

[1] On each of the "Checklists," the Department structured the objective-format questions such that the answer indicating that a product was more accessible was almost always "yes," while the answer indicating that a product likely contained barriers was usually "no." Each page of the Checklists accordingly stated, "Any 'no' answer may indicate a problem with accessibility." Some evaluators may have selected "not applicable" as a response, even when doing so was inappropriate, to avoid choosing the "inaccessible" answer.

[2] On each of the "Checklists," the Department structured the objective-format questions such that the answer indicating a product was more accessible was almost always "yes," while the answer indicating that a product likely contained barriers was usually "no." Each page of the Checklists accordingly stated, "Any 'no' answer may indicate a problem with accessibility." Some evaluators may have selected "not applicable" as a response, even when doing so was inappropriate, to avoid choosing the "inaccessible" answer.

[3] As with many other features that would increase accessibility, nondisabled users do not need to be inconvenienced when IT office equipment provides an option for the user to "confirm" his or her choices before triggering an action. Instead, equipment can be designed with a toggle button, enabling someone who prefers to "confirm" his or her selections to do so. When the button is not activated, nondisabled users can operate the equipment in the standard fashion. For example, someone with significant cerebral palsy may wish to use a "confirmation" mode. She would first push a "confirm selections" toggle button to turn on this option, then push "print" (or whatever other function she wishes to activate), then "confirm" to print. If she inadvertently hit a button near the "print" button, she would keep trying to hit "print." Once she had successfully chosen the "print" button, simply hitting "confirm" would enable her to print.

[4] Approximately 10% of the people who are blind use Braille. For people who are deaf and blind, however, a built-in Braille display may provide the only means of access to information that is not available in an electronic format (electronic format material is displayable in Braille through the use of assistive technology).

[5] The Department did not require agencies to confine their accessibility testing exclusively to federal employees with disabilities. As many agencies have found, partnerships with disability advocacy groups have often been the source of creative, cost-effective solutions.

## Data Tables

| **Table 1: IT Equipment Without Adjustable Sound Settings (Q1)** | |
|---|---|
| **Type of Agency** | **Number / Total** |
| Overall (All Agencies) | 380 / 1498 |
| Cabinet Level Agencies | 192 / 859 |
| All Large Agencies | 60 / 196 |
| All Medium Agencies | 44 / 145 |
| All Small Agencies | 28 / 161 |
| All Very Small Agencies | 56 / 137 |

| **Table 2: IT Equipment with Displays that Cannot be Read by Seated Users (Q2)** | |
|---|---|
| **Type of Agency** | **Number / Total** |
| Overall (All Agencies) | 240 / 1498 |
| Cabinet Level Agencies | 148 / 859 |
| All Large Agencies | 28 / 196 |
| All Medium Agencies | 36 / 145 |
| All Small Agencies | 12 / 161 |
| All Very Small Agencies | 16 / 137 |

| Table 3: IT Equipment that is Free-Standing with Operating Controls that are Too High (Q3) | |
|---|---|
| **Type of Agency** | **Number / Total** |
| Overall (All Agencies) | 116 / 1498 |
| Cabinet Level Agencies | 74 / 859 |
| All Large Agencies | 17 / 196 |
| All Medium Agencies | 6 / 145 |
| All Small Agencies | 5 / 161 |
| All Very Small Agencies | 14 / 137 |

| Table 4: IT Equipment that Provides Status Information and Cues in Visual but not Audible Format (Q4) | |
|---|---|
| **Type of Agency** | **Number / Total** |
| Overall (All Agencies) | 1159 / 1498 |
| Cabinet Level Agencies | 632 / 859 |
| All Large Agencies | 161 / 196 |
| All Medium Agencies | 121 / 145 |
| All Small Agencies | 122 / 161 |
| All Very Small Agencies | 123 / 137 |

| **Table 5: Fax Machines that Do Not Provide Visual Display of All Information (Q5)** | |
|---|---|
| **Type of Agency** | **Number / Total** |
| Overall (All Agencies) | 69 / 1498 |
| Cabinet Level Agencies | 37 / 859 |
| All Large Agencies | 11 / 196 |
| All Medium Agencies | 2 / 145 |
| All Small Agencies | 14 / 161 |
| All Very Small Agencies | 5 / 137 |

| **Table 6: IT Equipment Requiring More than 5 lbf to Operate (Q6)** | |
|---|---|
| **Type of Agency** | **Number / Total** |
| Overall (All Agencies) | 381 / 1498 |
| Cabinet Level Agencies | 247 / 859 |
| All Large Agencies | 33 / 196 |
| All Medium Agencies | 26 / 145 |
| All Small Agencies | 30 / 161 |
| All Very Small Agencies | 45 / 137 |

| Table 7: IT Equipment Not Allowing Users to Confirm Selections (Q7) | |
|---|---|
| **Type of Agency** | **Number / Total** |
| Overall (All Agencies) | 192 / 1498 |
| Cabinet Level Agencies | 114 / 859 |
| All Large Agencies | 10 / 196 |
| All Medium Agencies | 16 / 145 |
| All Small Agencies | 36 / 161 |
| All Very Small Agencies | 16 / 137 |

| Table 8: IT Equipment with Operating Mechanisms and Controls Requiring Tight Grasping, Twisting, or Pinching (Q8) | |
|---|---|
| **Type of Agency** | **Number / Total** |
| Overall (All Agencies) | 144 / 1498 |
| Cabinet Level Agencies | 95 / 859 |
| All Large Agencies | 7 / 196 |
| All Medium Agencies | 18 / 145 |
| All Small Agencies | 19 / 161 |
| All Very Small Agencies | 5 / 137 |

| **Table 9: IT Equipment Without a Headphone Jack for Users of Assistive Listening Devices (Q9)** | |
|---|---|
| **Type of Agency** | **Number / Total** |
| Overall (All Agencies) | 1409 / 1498 |
| Cabinet Level Agencies | 800 / 859 |
| All Large Agencies | 193 / 196 |
| All Medium Agencies | 127 / 145 |
| All Small Agencies | 153 / 161 |
| All Very Small Agencies | 136 / 137 |

| **Table 10: IT Equipment without Instructions Independently Accessible to Users with Disabilities Affecting Vision (Q10)** | |
|---|---|
| **Type of Agency** | **Number / Total** |
| Overall (All Agencies) | 1285 / 1498 |
| Cabinet Level Agencies | 714 / 859 |
| All Large Agencies | 187 / 196 |
| All Medium Agencies | 122 / 145 |
| All Small Agencies | 141 / 161 |
| All Very Small Agencies | 121 / 137 |

| Table 11: IT Equipment Without Alternate Operating Mechanisms for Users who Cannot Use Push-Style Controls (Q11) | |
|---|---|
| **Type of Agency** | **Number / Total** |
| Overall (All Agencies) | 1248 / 1498 |
| Cabinet Level Agencies | 686 / 859 |
| All Large Agencies | 179 / 196 |
| All Medium Agencies | 121 / 145 |
| All Small Agencies | 139 / 161 |
| All Very Small Agencies | 123 / 137 |

| Table 12: Accessibility of IT Equipment for Users Who are Hard of Hearing | | | | | | |
|---|---|---|---|---|---|---|
| **Problem Identified** | **Overall** | **Cabinet Agencies** | **Large Agencies** | **Medium Agencies** | **Small Agencies** | **Very Small Agencies** |
| Question 1 (no only) | 380 / 1498 | 192 / 859 | 60 / 196 | 44 / 145 | 28 / 161 | 56 / 137 |
| Question 5 (no only) | 69 / 1498 | 37 / 859 | 11 / 196 | 2 / 145 | 14 / 161 | 5 / 137 |
| Question 9 (no or not applicable) | 1409 / 1498 | 800 / 859 | 193 / 196 | 127 / 145 | 153 / 161 | 136 / 137 |
| **Surveyed items that did not meet all of the above survey questions** | 25 / 1498 | 12 / 859 | 7 / 196 | 1 / 145 | 4 / 161 | 1 / 137 |
| **Surveyed items that did not meet one or more of the above survey questions** | 1415 / 1498 | 802 / 859 | 195 / 196 | 127 / 145 | 155 / 161 | 136 / 137 |

**Table 13: Accessibility of IT Equipment for Users with Disabilities Affecting Both Vision and Hearing**

| Problem Identified | Overall | Cabinet Agencies | Large Agencies | Medium Agencies | Small Agencies | Very Small Agencies |
|---|---|---|---|---|---|---|
| Question 1 (no only) | 380 / 1498 | 192 / 859 | 60 / 196 | 44 / 145 | 28 / 161 | 56 / 137 |
| Question 4 (no only) | 1159 / 1498 | 632 / 859 | 161 / 196 | 121 / 145 | 122 / 161 | 123 / 137 |
| Question 5 (no only) | 69 / 1498 | 37 / 859 | 11 / 196 | 2 / 145 | 14 / 161 | 5 / 137 |
| Question 9 (no or not applicable) | 1409 / 1498 | 800 / 859 | 193 / 196 | 127 / 145 | 153 / 161 | 136 / 137 |
| Question 10 (no only) | 1285 / 1498 | 714 / 859 | 187 / 196 | 122 / 145 | 141 / 161 | 121 / 137 |
| Question 11 (no only) | 1248 / 1498 | 686 / 859 | 179 / 196 | 121 / 145 | 139 / 161 | 123 / 137 |
| **Surveyed items that did not meet all of the above survey questions** | 22 / 1498 | 10 / 859 | 7 / 196 | 1 / 145 | 3 / 161 | 1 / 137 |
| **Surveyed items that did not meet one or more of the above survey questions** | 1477 / 1498 | 845 / 859 | 196 / 196 | 138 / 145 | 161 / 161 | 137 / 137 |

**Table 14: Accessibility of IT Equipment for Users with Disabilities Affecting Hearing and who are Blind**

| **Problem Identified** | **Overall** | **Cabinet Agencies** | **Large Agencies** | **Medium Agencies** | **Small Agencies** | **Very Small Agencies** |
|---|---|---|---|---|---|---|
| Question 1 (no only) | 380 / 1498 | 192 / 859 | 60 / 196 | 44 / 145 | 28 / 161 | 56 / 137 |
| Question 4 (no only) | 1159 / 1498 | 632 / 859 | 161 / 196 | 121 / 145 | 122 / 161 | 123 / 137 |
| Question 9 (no or not applicable) | 1409 / 1498 | 800 / 859 | 193 / 196 | 127 / 145 | 153 / 161 | 136 / 137 |
| Question 10 (no only) | 1285 / 1498 | 714 / 859 | 187 / 196 | 122 / 145 | 141 / 161 | 121 / 137 |
| Question 11 (no only) | 1248 / 1498 | 686 / 859 | 179 / 196 | 121 / 145 | 139 / 161 | 123 / 137 |
| **Surveyed items that did not meet all of the above survey questions** | 319 / 1498 | 148 / 859 | 49 / 196 | 43 / 145 | 26 / 161 | 53 / 137 |
| **Surveyed items that did not meet one or more of the above survey questions** | 1477 / 1498 | 845 / 859 | 196 / 196 | 138 / 145 | 161 / 161 | 137 / 137 |

**Table 15: Accessibility of IT Equipment for Users Who are Deaf and Blind**

| **Problem Identified** | **Overall** | **Cabinet Agencies** | **Large Agencies** | **Medium Agencies** | **Small Agencies** | **Very Small Agencies** |
|---|---|---|---|---|---|---|
| Question 10 (no only) | 1285 / 1498 | 714 / 859 | 187 / 196 | 122 / 145 | 141 / 161 | 121 / 137 |
| Question 11 (no only) | 1248 / 1498 | 686 / 859 | 179 / 196 | 121 / 145 | 139 / 161 | 123 / 137 |
| **Surveyed items that did not meet all of the above survey questions** | 1215 / 1498 | 669 / 859 | 173 / 196 | 116 / 145 | 136 / 161 | 121 / 137 |
| **Surveyed items that did not meet one or more of the above survey questions** | 1318 / 1498 | 731 / 859 | 193 / 196 | 127 / 145 | 144 / 161 | 123 / 137 |

**Table 16: Accessibility of IT Equipment for Users Who are Deaf and Who Have Low Vision**

| **Problem Identified** | **Overall** | **Cabinet Agencies** | **Large Agencies** | **Medium Agencies** | **Small Agencies** | **Very Small Agencies** |
|---|---|---|---|---|---|---|
| Question 5 (no only) | 69 / 1498 | 37 / 859 | 11 / 196 | 2 / 145 | 14 / 161 | 5 / 137 |
| Question 10 (no only) | 1285 / 1498 | 714 / 859 | 187 / 196 | 122 / 145 | 141 / 161 | 121 / 137 |
| Question 11 (no only) | 1248 / 1498 | 686 / 859 | 179 / 196 | 121 / 145 | 139 / 161 | 123 / 137 |
| **Surveyed items that did not meet all of the above survey questions** | 65 / 1498 | 34 / 859 | 11 / 196 | 2 / 145 | 13 / 161 | 5 / 137 |
| **Surveyed items that did not meet one or more of the above survey questions** | 1320 / 1498 | 732 / 859 | 193 / 196 | 127 / 145 | 145 / 161 | 123 / 137 |

| **Table 17: Accessibility of IT Equipment for Users Who are Blind or Who Have Low Vision** | | | | | | |
|---|---|---|---|---|---|---|
| **Problem Identified** | **Overall** | **Cabinet Agencies** | **Large Agencies** | **Medium Agencies** | **Small Agencies** | **Very Small Agencies** |
| Question 4 (no only) | 1159 / 1498 | 632 / 859 | 161 / 196 | 121 / 145 | 122 / 161 | 123 / 137 |
| Question 10 (no only) | 1285 / 1498 | 714 / 859 | 187 / 196 | 122 / 145 | 141 / 161 | 121 / 137 |
| Question 11 (no only) | 1248 / 1498 | 686 / 859 | 179 / 196 | 121 / 145 | 139 / 161 | 123 / 137 |
| **Surveyed items that did not meet all of the above survey questions** | 1059 / 1498 | 567 / 859 | 145 / 196 | 112 / 145 | 119 / 161 | 116 / 137 |
| **Surveyed items that did not meet one or more of the above survey questions** | 1349 / 1498 | 751 / 859 | 195 / 196 | 130 / 145 | 145 / 161 | 128 / 137 |

| **Table 18: Accessibility of IT Equipment for Users Who Have Tremors or Limited Strength or Dexterity** | | | | | | |
|---|---|---|---|---|---|---|
| **Problem Identified** | **Overall** | **Cabinet Agencies** | **Large Agencies** | **Medium Agencies** | **Small Agencies** | **Very Small Agencies** |
| Question 6 (no or not applicable) | 381 / 1498 | 247 / 859 | 33 / 196 | 26 / 145 | 30 / 161 | 45 / 137 |
| Question 7 (no only) | 192 / 1498 | 114 / 859 | 10 / 196 | 16 / 145 | 36 / 161 | 16 / 137 |
| Question 8 (no or not applicable) | 144 / 1498 | 95 / 859 | 7 / 196 | 18 / 145 | 19 / 161 | 5 / 137 |
| Question 11 (no only) | 1248 / 1498 | 686 / 859 | 179 / 196 | 121 / 145 | 139 / 161 | 123 / 137 |
| **Surveyed items that did not meet all of the above survey questions** | 22 / 1498 | 11 / 859 | 0 / 196 | 1 / 145 | 10 / 161 | 0 / 137 |
| **Surveyed items that did not meet one or more of the above survey questions** | 1316 / 1498 | 738 / 859 | 181 / 196 | 126 / 145 | 140 / 161 | 131 / 137 |

| **Table 19: Accessibility of IT Equipment for Users Who Have Tremors or Limited Dexterity** | | | | | | |
|---|---|---|---|---|---|---|
| **Problem Identified** | **Overall** | **Cabinet Agencies** | **Large Agencies** | **Medium Agencies** | **Small Agencies** | **Very Small Agencies** |
| Question 7 (no only) | 192 / 1498 | 114 / 859 | 10 / 196 | 16 / 145 | 36 / 161 | 16 / 137 |
| Question 8 (no or not applicable) | 144 / 1498 | 95 / 859 | 7 / 196 | 18 / 145 | 19 / 161 | 5 / 137 |
| Question 11 (no only) | 1248 / 1498 | 686 / 859 | 179 / 196 | 121 / 145 | 139 / 161 | 123 / 137 |
| **Surveyed items that did not meet all of the above survey questions** | 35 / 1498 | 20 / 859 | 4 / 196 | 1 / 145 | 10 / 161 | 0 / 137 |
| **Surveyed items that did not meet one or more of the above survey questions** | 1297 / 1498 | 726 / 859 | 181 / 196 | 125 / 145 | 140 / 161 | 125 / 137 |

| Table 20: Accessibility of IT Equipment for Users Who Have Limited Strength | | | | | | |
|---|---|---|---|---|---|---|
| **Problem Identified** | **Overall** | **Cabinet Agencies** | **Large Agencies** | **Medium Agencies** | **Small Agencies** | **Very Small Agencies** |
| Question 6 (no or not applicable) | 381 / 1498 | 247 / 859 | 33 / 196 | 26 / 145 | 30 / 161 | 45 / 137 |
| Question 8 (no or not applicable) | 144 / 1498 | 95 / 859 | 7 / 196 | 18 / 145 | 19 / 161 | 5 / 137 |
| **Surveyed items that did not meet all of the above survey questions** | 83 / 1498 | 59 / 859 | 1 / 196 | 6 / 145 | 15 / 161 | 2 / 137 |
| **Surveyed items that did not meet one or more of the above survey questions** | 442 / 1498 | 283 / 859 | 39 / 196 | 38 / 145 | 34 / 161 | 48 / 137 |

| **Table 21: Accessibility of IT Equipment for Users With Cognitive Impairments and Learning Disabilities** | | | | | | |
|---|---|---|---|---|---|---|
| **Problem Identified** | **Overall** | **Cabinet Agencies** | **Large Agencies** | **Medium Agencies** | **Small Agencies** | **Very Small Agencies** |
| Question 4 (no only) | 1159 / 1498 | 632 / 859 | 161 / 196 | 121 / 145 | 122 / 161 | 123 / 137 |
| Question 7 (no only) | 192 / 1498 | 114 / 859 | 10 / 196 | 16 / 145 | 36 / 161 | 16 / 137 |
| Question 11 (no only) | 1248 / 1498 | 686 / 859 | 179 / 196 | 121 / 145 | 139 / 161 | 123 / 137 |
| **Surveyed items that did not meet all of the above survey questions** | 173 / 1498 | 95 / 859 | 10 / 196 | 16 / 145 | 36 / 161 | 16 / 137 |
| **Surveyed items that did not meet one or more of the above survey questions** | 1336 / 1498 | 747 / 859 | 194 / 196 | 125 / 145 | 142 / 161 | 128 / 137 |

| Table 22: Accessibility of IT Equipment for Users Who Use Wheelchairs | | | | | | |
|---|---|---|---|---|---|---|
| **Problem Identified** | **Overall** | **Cabinet Agencies** | **Large Agencies** | **Medium Agencies** | **Small Agencies** | **Very Small Agencies** |
| Question 2 (no only) | 240 / 1498 | 148 / 859 | 28 / 196 | 36 / 145 | 12 / 161 | 16 / 137 |
| Question 3 (no only) | 116 / 1498 | 74 / 859 | 17 / 196 | 6 / 145 | 5 / 161 | 14 / 137 |
| **Surveyed items that did not meet all of the above survey questions** | 63 / 1498 | 39 / 859 | 9 / 196 | 6 / 145 | 1 / 161 | 8 / 137 |
| **Surveyed items that did not meet one or more of the above survey questions** | 293 / 1498 | 183 / 859 | 36 / 196 | 36 / 145 | 16 / 161 | 22 / 137 |

## *Other IT Office Equipment Appendix B*[1]

## Question-by-Question Responses to Other IT Equipment Accessibility Checklist: Statistics by Type of IT Equipment

**Question 1**: Can users change sound settings, such as volume?

| Type of IT Equipment | Yes | No | Not Applicable |
|---|---|---|---|
| Printer | 36 / 530 (6.8%) | 115 / 530 (21.7%) | 379 / 530 (71.5%) |
| Fax machine | 137 / 326 (42%) | 90 / 326 (27.6%) | 99 / 326 (30.4%) |
| Copier | 34 / 482 (7.1%) | 160 / 482 (33.2%) | 288 / 482 (59.8%) |
| Other | 79 / 160 (49.4%) | 15 / 160 (9.4%) | 66 / 160 (41.3%) |

**Question 2**: Are any displays — including liquid crystal displays— readable by persons who are in a seated position, such as those who use wheelchairs?

| Type of IT Equipment | Yes | No | Not Applicable |
|---|---|---|---|
| Printer | 430 / 530 (81.1%) | 63 / 530 (11.9%) | 37 / 530 (7%) |
| Fax machine | 248 / 326 (76.1%) | 62 / 326 (19%) | 16 / 326 (4.9%) |
| Copier | 366 / 482 (75.9%) | 104 / 482 (21.6%) | 12 / 482 (2.5%) |
| Other | 122 / 160 (76.3%) | 11 / 160 (6.9%) | 27 / 160 (16.9%) |

**Question 3**: For free-standing equipment, is the highest operable part of controls, dispensers, receptacles, and other operable equipment placed within at least one of the following reach ranges?

(a) If a forward approach is required, the maximum high forward reach is 48 inches.

(b) If a side approach is allowed, and the reach is not over an obstruction, the maximum high side reach is 54 inches; if it is over an obstruction which is no more than 24 inches wide and 34 inches high, the maximum high side reach is 46 inches.

| Type of IT Equipment | Yes | No | Not Applicable |
|---|---|---|---|
| Printer | 394 / 530 (74.3%) | 35 / 530 (6.6%) | 101 / 530 (19.1%) |
| Fax machine | 243 / 326 (74.5%) | 21 / 326 (6.4%) | 62 / 326 (19%) |
| Copier | 387 / 482 (80.3%) | 51 / 482 (10.6%) | 44 / 482 (9.1%) |
| Other | 123 / 160 (76.9%) | 9 / 160 (5.6%) | 28 / 160 (17.5%) |

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[1] This document is available on the Department of Justice's section 508 Web site (www.usdoj.gov/crt/508). People with disabilities may request copies in Braille, large print, or on computer disk by calling 1-800-514-0301 (voice) or 1-800-514-0383 (TTY).

**Question 4**: Are status information and cues that are provided in a visual manner also available in an audible manner for persons with disabilities affecting vision?

| **Type of IT Equipment** | **Yes** | **No** | **Not Applicable** |
|---|---|---|---|
| Printer | 78 / 530 (14.7%) | 399 / 530 (75.3%) | 53 / 530 (10%) |
| Fax machine | 60 / 326 (18.4%) | 248 / 326 (76.1%) | 18 / 326 (5.5%) |
| Copier | 31 / 482 (6.4%) | 418 / 482 (86.7%) | 33 / 482 (6.8%) |
| Other | 38 / 160 (23.8%) | 94 / 160 (58.8%) | 28 / 160 (17.5%) |

**Question 5**: For fax machines, does the machine provide line status information (such as notifying the user of a "busy" fax line) in a visual manner (either text display or status lights) for users who are deaf or hard of hearing?

| **Type of IT Equipment** | **Yes** | **No** | **Not Applicable** |
|---|---|---|---|
| Printer | 48 / 530 (9.1%) | 19 / 530 (3.6%) | 463 / 530 (87.4%) |
| Fax machine | 267 / 326 (81.9%) | 27 / 326 (8.3%) | 32 / 326 (9.8%) |
| Copier | 60 / 482 (12.4%) | 16 / 482 (3.3%) | 406 / 482 (84.2%) |
| Other | 24 / 160 (15%) | 7 / 160 (4.4%) | 129 / 160 (80.6%) |

**Question 6**: Is the force required to operate or activate controls no greater than 5 lbf?

| **Type of IT Equipment** | **Yes** | **No** | **Not Applicable** |
|---|---|---|---|
| Printer | 388 / 530 (73.2%) | 104 / 530 (19.6%) | 38 / 530 (7.2%) |
| Fax machine | 253 / 326 (77.6%) | 42 / 326 (12.9%) | 31 / 326 (9.5%) |
| Copier | 341 / 482 (70.7%) | 109 / 482 (22.6%) | 32 / 482 (6.6%) |
| Other | 135 / 160 (84.4%) | 17 / 160 (10.6%) | 8 / 160 (5%) |

**Question 7**: Can users confirm their selections? For instance, if a person has limited fine motor control, such as a person who a palsy, it is helpful for him or her to have the opportunity to confirm selections — such as "number of copies" selected — before the operation begins.

| **Type of IT Equipment** | **Yes** | **No** | **Not Applicable** |
|---|---|---|---|
| Printer | 363 / 530 (68.5%) | 61 / 530 (11.5%) | 106 / 530 (20%) |
| Fax machine | 235 / 326 (72.1%) | 57 / 326 (17.5%) | 34 / 326 (10.4%) |
| Copier | 410 / 482 (85.1%) | 59 / 482 (12.2%) | 13 / 482 (2.7%) |
| Other | 110 / 160 (68.8%) | 15 / 160 (9.4%) | 35 / 160 (21.9%) |

**Question 8**: Are controls and operating mechanisms operable with one hand and operable without tight grasping, pinching, or twisting of the wrist?

| **Type of IT Equipment** | **Yes** | **No** | **Not Applicable** |
|---|---|---|---|
| Printer | 477 / 530 (90%) | 26 / 530 (4.9%) | 27 / 530 (5.1%) |
| Fax machine | 297 / 326 (91.1%) | 15 / 326 (4.6%) | 14 / 326 (4.3%) |
| Copier | 441 / 482 (91.5%) | 30 / 482 (6.2%) | 11 / 482 (2.3%) |
| Other | 139 / 160 (86.9%) | 13 / 160 (8.1%) | 8 / 160 (5%) |

**Question 9**: Is there a headphone jack for accessing information by users of assistive listening systems?

| **Type of IT Equipment** | **Yes** | **No** | **Not Applicable** |
|---|---|---|---|
| Printer | 15 / 530 (2.8%) | 259 / 530 (48.9%) | 256 / 530 (48.3%) |
| Fax machine | 14 / 326 (4.3%) | 222 / 326 (68.1%) | 90 / 326 (27.6%) |
| Copier | 4 / 482 (0.8%) | 294 / 482 (61%) | 184 / 482 (38.2%) |
| Other | 56 / 160 (35%) | 52 / 160 (32.5%) | 52 / 160 (32.5%) |

**Question 10**: Are instructions and all information for use accessible to and independently usable by persons with disabilities affecting vision, such as with recorded information or Braille labels and directions?

| **Type of IT Equipment** | **Yes** | **No** | **Not Applicable** |
|---|---|---|---|
| Printer | 48 / 530 (9.1%) | 443 / 530 (83.6%) | 39 / 530 (7.4%) |
| Fax machine | 14 / 326 (4.3%) | 288 / 326 (88.3%) | 24 / 326 (7.4%) |
| Copier | 16 / 482 (3.3%) | 435 / 482 (90.2%) | 31 / 482 (6.4%) |
| Other | 27 / 160 (16.9%) | 119 / 160 (74.4%) | 14 / 160 (8.8%) |

**Question 11**: Are there alternate operating mechanisms for persons who cannot use push-style controls? Example: Are there alternative methods of control — such as voice activation — for routine tasks?

| **Type of IT Equipment** | **Yes** | **No** | **Not Applicable** |
|---|---|---|---|
| Printer | 41 / 530 (7.7%) | 415 / 530 (78.3%) | 74 / 530 (14%) |
| Fax machine | 8 / 326 (2.5%) | 287 / 326 (88%) | 31 / 326 (9.5%) |
| Copier | 11 / 482 (2.3%) | 440 / 482 (91.3%) | 31 / 482 (6.4%) |
| Other | 37 / 160 (23.1%) | 106 / 160 (66.3%) | 17 / 160 (10.6%) |

*Other IT Office Equipment Appendix C*[1]

## Question-by-Question Responses to Other IT Office Equipment Accessibility Checklist:

### Statistics by Agency Size

| **Question 1**: Can the user change sound settings, such as volume? | | | | |
|---|---|---|---|---|
| **Type of Agency** | **Yes** | **No** | **Not Applicable** | **Total** |
| Overall (All Agencies) | 286 (19.1%) | 380 (25.4%) | 832 (55.5%) | 1498 |
| Cabinet Level Agencies | 171 (19.9%) | 192 (22.4%) | 496 (57.7%) | 859 |
| All Large Agencies | 38 (19.4%) | 60 (30.6%) | 98 (50%) | 196 |
| All Medium Agencies | 24 (16.6%) | 44 (30.3%) | 77 (53.1%) | 145 |
| All Small Agencies | 32 (19.9%) | 28 (17.4%) | 101 (62.7%) | 161 |
| All Very Small Agencies | 21 (15.3%) | 56 (40.9%) | 60 (43.8%) | 137 |

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[1] This document is available on the Department of Justice's section 508 Web site (www.usdoj.gov/crt/508). People with disabilities may request copies in Braille, large print, or on computer disk by calling 1-800-514-0301 (voice) or 1-800-514-0383 (TTY).

**Question 2**: Are any displays — including liquid crystal displays — readable by persons who are in a seated position, such as those who use wheelchairs?

| **Type of Agency** | **Yes** | **No** | **Not Applicable** | **Total** |
|---|---|---|---|---|
| Overall (All Agencies) | 1166 (77.8%) | 240 (16%) | 92 (6.1%) | 1498 |
| Cabinet Level Agencies | 642 (74.7%) | 148 (17.2%) | 69 (8%) | 859 |
| All Large Agencies | 160 (81.6%) | 28 (14.3%) | 8 (4.1%) | 196 |
| All Medium Agencies | 101 (69.7%) | 36 (24.8%) | 8 (5.5%) | 145 |
| All Small Agencies | 147 (91.3%) | 12 (7.5%) | 2 (1.2%) | 161 |
| All Very Small Agencies | 116 (84.7%) | 16 (11.7%) | 5 (3.6%) | 137 |

**Question 3**: For free-standing equipment, is the highest operable part of controls, dispensers, receptacles, and other operable equipment placed within at least one of the following reach ranges?

(a) If a forward approach is required, the maximum high forward reach is 48 inches.

(b) If a side approach is allowed, and the reach is not over an obstruction, the maximum high side reach is 54 inches; if it is over an obstruction which is no more than 24 inches wide and 34 inches high, the maximum high side reach is 46 inches.

| **Type of Agency** | **Yes** | **No** | **Not Applicable** | **Total** |
|---|---|---|---|---|
| Overall (All Agencies) | 1147 (76.6%) | 116 (7.7%) | 235 (15.7%) | 1498 |
| Cabinet Level Agencies | 634 (73.8%) | 74 (8.6%) | 151 (17.6%) | 859 |
| All Large Agencies | 145 (74%) | 17 (8.7%) | 34 (17.3%) | 196 |
| All Medium Agencies | 119 (82.1%) | 6 (4.1%) | 20 (13.8%) | 145 |
| All Small Agencies | 149 (92.5%) | 5 (3.1%) | 7 (4.3%) | 161 |
| All Very Small Agencies | 100 (73%) | 14 (10.2%) | 23 (16.8%) | 137 |

**Question 4**: Are status information and cues that are provided in a visual manner also available in audible manner for persons with disabilities affecting vision?

| **Type of Agency** | **Yes** | **No** | **Not Applicable** | **Total** |
|---|---|---|---|---|
| Overall (All Agencies) | 207 (13.8%) | 1159 (77.4%) | 132 (8.8%) | 1498 |
| Cabinet Level Agencies | 141 (16.4%) | 632 (73.6%) | 86 (10%) | 859 |
| All Large Agencies | 33 (16.8%) | 161 (82.1%) | 2 (1%) | 196 |
| All Medium Agencies | 14 (9.7%) | 121 (83.4%) | 10 (6.9%) | 145 |
| All Small Agencies | 15 (9.3%) | 122 (75.8%) | 24 (14.9%) | 161 |
| All Very Small Agencies | 4 (2.9%) | 123 (89.8%) | 10 (7.3%) | 137 |

**Question 5**: For fax machines, does the machine provide line status information (such as notifying the user of a "busy" fax line) in a visual manner (either text display or status lights) for users who are deaf or hard of hearing?

| **Type of Agency** | **Yes** | **No** | **Not Applicable** | **Total** |
|---|---|---|---|---|
| Overall (All Agencies) | 399 (26.6%) | 69 (4.6%) | 1030 (68.8%) | 1498 |
| Cabinet Level Agencies | 226 (26.3%) | 37 (4.3%) | 596 (69.4%) | 859 |
| All Large Agencies | 36 (18.4%) | 11 (5.6%) | 149 (76%) | 196 |
| All Medium Agencies | 55 (37.9%) | 2 (1.4%) | 88 (60.7%) | 145 |
| All Small Agencies | 35 (21.7%) | 14 (8.7%) | 112 (69.6%) | 161 |
| All Very Small Agencies | 47 (34.3%) | 5 (3.6%) | 85 (62%) | 137 |

| **Question 6**: Is the force required to operate or activate controls no greater than 5 lbf? | | | | |
|---|---|---|---|---|
| **Type of Agency** | **Yes** | **No** | **Not Applicable** | **Total** |
| Overall (All Agencies) | 1117 (74.6%) | 272 (18.2%) | 109 (7.3%) | 1498 |
| Cabinet Level Agencies | 612 (71.2%) | 170 (19.8%) | 77 (9%) | 859 |
| All Large Agencies | 163 (83.2%) | 31 (15.8%) | 2 (1%) | 196 |
| All Medium Agencies | 119 (82.1%) | 17 (11.7%) | 9 (6.2%) | 145 |
| All Small Agencies | 131 (81.4%) | 19 (11.8%) | 11 (6.8%) | 161 |
| All Very Small Agencies | 92 (67.2%) | 35 (25.5%) | 10 (7.3%) | 137 |

**Question 7**: Can users confirm their selections?

For instance, if a person has limited fine motor control, such as a person with a palsy, it is helpful for him or her to have the opportunity to confirm selections — such as "number of copies" selected — before the operation begins.

| **Type of Agency** | **Yes** | **No** | **Not Applicable** | **Total** |
|---|---|---|---|---|
| Overall (All Agencies) | 1118 (74.6%) | 192 (12.8%) | 188 (12.6%) | 1498 |
| Cabinet Level Agencies | 619 (72.1%) | 114 (13.3%) | 126 (14.7%) | 859 |
| All Large Agencies | 176 (89.8%) | 10 (5.1%) | 10 (5.1%) | 196 |
| All Medium Agencies | 114 (78.6%) | 16 (11%) | 15 (10.3%) | 145 |
| All Small Agencies | 100 (62.1%) | 36 (22.4%) | 25 (15.5%) | 161 |
| All Very Small Agencies | 109 (79.6%) | 16 (11.7%) | 12 (8.8%) | 137 |

**Question 8**: Are controls and operating mechanisms operable with one hand and operable without tight grasping, pinching, or twisting of the wrist?

| **Type of Agency** | **Yes** | **No** | **Not Applicable** | **Total** |
|---|---|---|---|---|
| Overall (All Agencies) | 1354 (90.4%) | 84 (5.6%) | 60 (4%) | 1498 |
| Cabinet Level Agencies | 764 (88.9%) | 47 (5.5%) | 48 (5.6%) | 859 |
| All Large Agencies | 189 (96.4%) | 5 (2.6%) | 2 (1%) | 196 |
| All Medium Agencies | 127 (87.6%) | 11 (7.6%) | 7 (4.8%) | 145 |
| All Small Agencies | 142 (88.2%) | 18 (11.2%) | 1 (0.6%) | 161 |
| All Very Small Agencies | 132 (96.4%) | 3 (2.2%) | 2 (1.5%) | 137 |

**Question 9**: Is there a headphone jack for accessing information by users of assistive listening systems?

| **Type of Agency** | **Yes** | **No** | **Not Applicable** | **Total** |
|---|---|---|---|---|
| Overall (All Agencies) | 89 (5.9%) | 827 (55.2%) | 582 (38.9%) | 1498 |
| Cabinet Level Agencies | 59 (6.9%) | 448 (52.2%) | 352 (41%) | 859 |
| All Large Agencies | 3 (1.5%) | 134 (68.4%) | 59 (30.1%) | 196 |
| All Medium Agencies | 18 (12.4%) | 77 (53.1%) | 50 (34.5%) | 145 |
| All Small Agencies | 8 (5%) | 77 (47.8%) | 76 (47.2%) | 161 |
| All Very Small Agencies | 1 (0.7%) | 91 (66.4%) | 45 (32.8%) | 137 |

**Question 10**: Are instructions and all information for use accessible to and independently usable by persons with disabilities affecting vision, such as with recorded information or Braille labels and directions?

| **Type of Agency** | **Yes** | **No** | **Not Applicable** | **Total** |
|---|---|---|---|---|
| Overall (All Agencies) | 105 (7%) | 1285 (85.8%) | 108 (7.2%) | 1498 |
| Cabinet Level Agencies | 71 (8.3%) | 714 (83.1%) | 74 (8.6%) | 859 |
| All Large Agencies | 8 (4.1%) | 187 (95.4%) | 1 (0.5%) | 196 |
| All Medium Agencies | 9 (6.2%) | 122 (84.1%) | 14 (9.7%) | 145 |
| All Small Agencies | 10 (6.2%) | 141 (87.6%) | 10 (6.2%) | 161 |
| All Very Small Agencies | 7 (5.1%) | 121 (88.3%) | 9 (6.6%) | 137 |

**Question 11**: Are there alternate operating mechanisms for persons who cannot use push-style controls?

Example: Are there alternative methods of control — such as voice activation — for routine tasks?

| **Type of Agency** | **Yes** | **No** | **Not Applicable** | **Total** |
|---|---|---|---|---|
| Overall (All Agencies) | 97 (6.5%) | 1248 (83.3%) | 153 (10.2%) | 1498 |
| Cabinet Level Agencies | 72 (8.4%) | 686 (79.9%) | 101 (11.8%) | 859 |
| All Large Agencies | 5 (2.6%) | 179 (91.3%) | 12 (6.1%) | 196 |
| All Medium Agencies | 18 (12.4%) | 121 (83.4%) | 6 (4.1%) | 145 |
| All Small Agencies | 1 (0.6%) | 139 (86.3%) | 21 (13%) | 161 |
| All Very Small Agencies | 1 (0.7%) | 123 (89.8%) | 13 (9.5%) | 137 |

# Procurement Policies and Practices[1,2]

While section 508 applies whenever federal executive branch agencies "procure, develop, maintain, or use" electronic and information technology (EIT), its enforcement mechanisms apply only to EIT "procured" on or after August 7, 2000. Procurement likely to become the focus for implementation of section 508 for most agencies.[3] Most agencies are subject to the Federal Acquisition Regulation (FAR). Section 508 requires the FAR Council to revise the FAR to incorporate the Access Board's Section 508 Standards. 29 U.S.C. § 794d(a)(3). Each agency that has procurement regulations, policies, and directives is also required to revise those documents. Id.

With a few exceptions, most agencies are not adequately incorporating disability accessibility issues into their mainstream procurement policies and practices. Agencies will have to significantly change these policies and practices to comply with section 508. This Report includes sample contract language and procurement practices upon which agencies should draw when determining their next steps.

### Findings[4]

5a. Are your agency's acquisitions subject to the Federal Acquisition Regulation (FAR)?

Question 5a of the Component Questionnaire asked whether agencies are subject to the Federal Acquisition Regulation (FAR) or use it as guidance for developing their procurement policies and procedures. The number of components following the FAR is significant because within 6 months of the Access Board's issuance of Standards for accessible EIT, the Federal Acquisition Regulatory Council (FAR Council) will incorporate these Standards into the FAR. 29 U.S.C. § 794d. Accordingly, new procurements by agencies that are subject to the FAR will automatically be subject to the new 508 Standards under the FAR's own terms. All agencies — whether or not they are subject to the FAR — are instructed by statute to "revise the federal procurement policies and directives under the control of the department or agency to incorporate those standards." Id. Agencies which are not subject to the FAR will have more work to do to incorporate the Access Board's Section 508 Standards into their procurement policies and directives.

Throughout the development of the Section 508 Standards, the Access Board has been consulting with the FAR Council to make the incorporation of these Standards into the FAR as smooth as possible.

A sizable majority of agencies in all size categories are subject to the FAR. Accordingly, most agencies will not have to amend their acquisition regulations when the Access Board's Section 508 Standards become final; the FAR Council will revise the FAR. Agencies that are not subject to the FAR include, for example, the U.S. Postal Service and smaller agencies such as the Japan-U.S. Friendship Commission. These agencies, however, should follow the lead of the FAR Council and begin consulting with the Access Board prior to the release of final Standards to implement section 508. The Access Board has expressed its willingness to help agencies not subject to the FAR and such agencies should seek out the Board's assistance at their earliest opportunity.

5b. If your agency's acquisitions follow the FAR (formally or informally), has your component established a strategic plan for meeting its electronic and information technology needs -- including, among other things, accommodations for individuals with disabilities -- pursuant to OMB Circular A-130, as required by section 39.101 of the FAR?

Even prior to the 1998 amendments strengthening section 508 of the Rehabilitation Act, FAR regulations required agencies to review the accessibility of information technology products prior to their acquisition. FAR § 39.101 requires agencies to comply with OMB Circular A-130 (revised Feb. 8, 1996), which states in relevant part that agencies shall "[a]cquire information technology in a manner that considers the need for accommodations of accessibility for individuals with disabilities to the extent that needs for such access exist." OMB Circular A-130, sec. 8b(5)(d). Appendix IV of OMB Circular A-130 (Analysis of Key Sections) further explains that "[a]gencies should ensure that acquisitions for new information technology comply with GSA regulations concerning information technology accessibility for individuals with disabilities [41 C.F.R. 201-20.103-7]" (bracketed citation in the original). The cited regulation is a section of the Federal Information Resources Management Regulations (FIRMR), which was repealed in light of the Brooks Act in 1996. See 61 FR 39359 (July 29, 1996), amendment 9 to the FIRMR, (repeal effective August 8, 1996). While the FIRMR provision cited by OMB has been repealed, agencies are still required by the FAR to comply with the general language of OMB Circular A-130. 5 C.F.R. § 1310.5 (listing OMB Circular A-130 as among those that remain in effect).

Despite this history, very few agencies of any size maintain strategic plans that include reviewing the accessibility of EIT products before they are acquired. Some agencies are developing or reviewing plans to integrate EIT accessibility into existing strategic plans, or plan to do so in the near future. Almost half of the agencies, however, continue to address EIT accessibility on an ad hoc basis and have no plans to change this practice.

1. Does your component use any disability-related language in contracts for electronic and information technology?

Question 1 asked about the frequency with which agencies incorporate disability-related language into the mainstream procurement contracts for EIT. Few agencies do so on a routine basis. While many agencies indicated that they "always" or "often" use disability-related language, a review of the sample language submitted by the agencies reveals that most of it relates to employment discrimination, non-discrimination on the basis of disability by agency contractors, or preferences for disabled Veterans, rather than EIT accessibility. Another problem appears to be a lack of consistency with which some of the better provisions are employed, even within the agencies that authored them. By far the biggest problem, however, is that most agencies in all size categories never incorporate EIT accessibility clauses into their procurement contracts.

A close examination of the data reveals a few patterns regarding the kind of agencies that use strong language specifically targeting the accessibility of EIT products. Not surprisingly, many of the strongest provisions were drafted by agencies whose responsibilities include advancing the civil rights of persons with disabilities, such as the Architectural and Transportation Barriers Compliance Board (Access Board),[5] the Committee for Purchase from People Who Are Blind or Severely Disabled (Committee for Purchase),[6] and the Federal Communications Commission (using language similar to that used by the Committee for Purchase). Other agencies that showed leadership in this area are those that have fully integrated assistive technology programs into their mainstream procurement and IT infrastructure, such as the Department of Education.[7] Still other agencies with no particular mission-related focus on disability issues, however, such as the Coast Guard, also use strong language.[8]

***A Promising Practice: The Department of Education's Leadership in Incorporating Accessibility Standards into EIT Procurement Contracts***

In March 1997, the Department of Education released its Requirements for Accessible Software Design. When the Department began including standard language in its contracts for software developed or acquired for the Department to be accessible and meet the criteria set by the Requirements, industry responded positively. Ultimately, the Department won the National Partnership for Reinventing Government Hammer Award for its efforts.

Some agencies, especially many smaller agencies, rely on GSA schedules for their procurement. Some of these agencies indicated that they assume that GSA routinely conducts an analysis of relevant criteria, such as the degree to which EIT incorporates accessibility features.

2. How does your component ensure that acquisition of electronic and information technologies will be conducted in a manner that assures users with disabilities will have equal access to and use of the same data bases, operating systems, application programs, and telecommunication systems as their nondisabled colleagues?

Question 2 asked components to identify how they ensured that EIT acquisition would provide people with disabilities equal access to and use of the same data bases, operating systems, software applications, and telecommunications systems as their nondisabled colleagues. One way to satisfy this goal is to integrate disability accessibility evaluations into the acquisition processes already established within agencies' existing Information Technology offices (these offices were generally established to satisfy the requirements of the Clinger-Cohen Act of 1996, 40 U.S.C. §§ 1400 et seq.). Question 2 was designed to determine whether agencies had already achieved this kind of integration prior to the full implementation of section 508, and, of those that had not, whether they had any current plans to do so.

Relatively few agencies have already assigned their IT offices to address disability accessibility issues. Indeed, the vast majority of agencies do not have any set method of ensuring that their EIT is accessible; accessibility is addressed on an ad hoc basis, if at all. The ad hoc approach, which may have worked well in the past when technology was not as complicated, is less likely to result in successfully accommodating persons with disabilities as technology grows in sophistication and it becomes more difficult — indeed, impossible at times — to retrofit the technology to work with assistive devices used by persons with disabilities, such as screen readers. Section 508 is likely to improve significantly the extent to which agencies integrate accessibility issues into mainstream technology procurement, especially as the section 508 implementing Standards are integrated into the FAR and other acquisition regulations. Also, unlike sections 501 and 504 of the Rehabilitation Act which (with a few exceptions in limited circumstances) generally do not require agencies to provide reasonable accommodations except upon request, section 508 requires an agency to consider accessibility every time it "develops, procures, maintains, or uses" electronic or information technology.[9]

3. How does your component identify the requirements of users with disabilities in order to achieve integrated solutions during acquisition planning and procurement?

EIT accessibility issues are often complex, involving an interplay between the use for which an EIT product or system is to be employed and the strengths and weaknesses, abilities and disabilities of its users. Agencies that routinely do a better job of providing accommodations to individuals with disabilities are generally those which involve users with disabilities in the earliest stages of EIT acquisition.

Question 3 was designed to measure the degree to which federal agencies and departments have been involving users with disabilities in the earliest stages of EIT procurement, prior to the full implementation of section 508. The data suggests that relatively few agencies meet this goal. Agencies already integrating persons with disabilities into the procurement process tend to be those which showed high degrees of accessibility on their section 508 self-evaluations as a whole.

Several agencies commented that they did not have employees with disabilities — nor access to members of the public with disabilities — to assist them during EIT planning, acquisition, or testing. This lack of employees with disabilities may account for the relatively high percentages of agencies that only consult with users with disabilities regarding EIT accessibility on an ad hoc basis, if at all. On the other hand, some of these agencies indicated in their overall agency evaluations that although they involve employees with disabilities in procurement processes on an ad hoc basis, the involvement is real and meaningful when it does occur. In one case, the Social Security

Administration noted that, "[i]n the past, employees with disabilities have had opportunities to define requirements and to be part of technical evaluation teams."

A few components indicated that they are exploring alternative strategies instead of involving users with disabilities in the early stages of procurement. Some of these alternatives include seeking advice from other components within the same agency or other agencies, surveying users of disabilities prior to procurement, and relying on GSA's compliance with Section 508 Standards in its existing contracts.

4. Does your component maintain a list of programs that provide training for management, procurement, and technical personnel on how to meet the accessibility needs of end users with disabilities and the many methods available to meet those requirements?

Only a very few components of any size maintain lists of EIT accessibility training resources for management, procurement, and technical personnel on how to meet the accessibility needs of end users with disabilities. Instead, most agencies identify training resources only on an 'as-needed' basis.

***Example: Inadequate training of technical personnel leads to underutilization of telephone system's features for blind employees at one agency.***

A blind federal employee changed jobs from one federal agency to another. At the first agency, her telephone system had been set up to give her a nonstandard dial tone whenever she had a voice mail message waiting, since she was unable to see the visual notification provided for sighted users. When she moved to another agency, she was told that the new agency did not have this technology. On her own initiative, the employee discovered that the two agencies used similar telephone systems. Technicians from the second agency, when put into contact with technicians from the first agency, found that merely by activating a particular function in the telephone system's software, their blind employees had full access to their voice mail system. The feature had existed for years, but had not been activated. Once activated, the feature helped not only her, but other agency employees who were blind or who had low vision.

Users with disabilities often fault their agencies for not providing adequate training. Trainers of mainstream EIT rarely understand the accessibility features built into their own products, much less how these products work with assistive technologies. Unless management, procurement, and technical personnel — and ultimately end-users with disabilities — are given adequate training, accessibility features will be underutilized. Consequently, users with disabilities will be unable to maximize their job performance and the employing agency will not have use of their full talents.

***Example: Vendor trainers are often uninformed about accessibility issues***

A trainer contracted by an agency to demonstrate how to conduct searches in a proprietary legal database may not know all of the keystroke equivalents for "point and click" mouse/icon instructions. Without this knowledge, training is likely to be inadequate for users who cannot use a computer mouse, such as those who are blind, have low vision, or have disabilities affecting manual dexterity. The same trainer is likely to be unfamiliar with screen readers and how they affect usability of the proprietary legal database.

Federal agencies should assign a high priority to the development and wide distribution of information regarding the availability of appropriate training resources. Whenever agencies procure training from a vendor or contractor, they should inquire about the trainers' level of expertise in disability accessibility issues. Mechanisms should be set up to facilitate inter-agency information-sharing.

## General Recommendations

For increased coordination and cooperation to be efficient and effective, the Department recommends the following:

### *Increased Coordination*

1. The President should issue a *Technology Accessibility Coordination Directive* to:

a. Revitalize the Interagency Disability Coordinating Council (IDCC), as set forth in 29 U.S.C. § 794c, with the Attorney General as Chair, consistent with Executive Order 12250, 29 U.S.C. § 2000d-1;[10]

b. Direct certain Federal agencies (including the General Services Administration, the Department of Defense, and the Department of Transportation), and invite other agencies (including the Federal Communications Commission and the U.S. Postal Service) to participate as nonstatutory members in the IDCC; and

c. Direct the Office of Personnel Management, in consultation with the Department of Justice, the EEOC, and the Access Board, to issue guidance to agencies clarifying the relationship among sections 501, 504, and 508 of the Rehabilitation Act.

2. The Universal Access Working Group (UAWG).[11] Each cabinet level, large, and mid-sized agency, along with representatives from small and very small agencies, should join the inter-agency UAWG. See General Appendix A (Categories of Agencies). The UAWG has been an instrumental force in advocating for accessible technology throughout the Federal Government and private sector. Its relevance would be increased if its members were designated as their agencies' representatives, rather than participating as individual volunteers, and if more agencies were involved.

3. 508 Coordinators. Each agency should designate Coordinators for purposes of complying with the substantive and reporting requirements of section 508. Agencies should either select multiple Coordinators — to represent each of the agency's information technology, telecommunications, disability accommodations, and other relevant sectors — or a single representative to act as an intermediary among these sectors. The Section 508 Coordinators of cabinet level, large, and mid-sized agencies, along with representatives from small and very small agencies, should attend UAWG meetings as representatives of their agencies. See General Appendix A (Categories of Agencies). A list of all Section 508 Coordinators should be developed and distributed among all agencies. The Section 508 Coordinators should meet regularly with agencies' Section 504 Coordinators.

### *Technical Assistance*

1. The General Services Administration (GSA) and the Access Board, which have statutory authority for providing technical assistance under section 508, should share in the following responsibilities:

a. Information Hotline. An information hotline should be established for federal agencies, persons with disabilities, and the IT industry. The Department of Justice's Americans with Disabilities Act Information Line should serve as a model.

b. Technical Support Center. An interagency technical assistance support center should be established where agencies can receive specific, hands-on assistance tailored to their individual concerns. The Job Accommodation Network of the President's Committee on Employment of Persons with Disabilities at the Department of Labor should serve as a model.

c. Internet Resources. An Internet message board and listserv (an e-mail mailing list for discussion among a group of users) should be maintained where knowledgeable agencies can post solutions to particular problems and where agencies trying to address EIT accessibility issues can post questions. Agencies that have developed evaluation criteria, techniques, and reports of existing EIT products should make these available to other agencies using these Internet resources [recommendation of the Social Security Administration].

2. GSA should do the following:

a. Accessible Products Clearinghouse. GSA should be directed to act as a clearinghouse

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for information regarding accessible EIT products. Any manufacturer's information regarding accessibility of EIT products should be made available to all federal contract officers and their technical representatives through this Clearinghouse. This program should allow manufacturers to certify that their products meet the 508 standards. The Energy Star and Y2K programs may provide models on which to build.

b. Training Clearinghouse. A clearinghouse for accessible training resources — and training regarding accessibility — for management, IT and procurement personnel, and end users with disabilities should be established. Vendor information regarding accessible training opportunities should be made available to all agencies through this Clearinghouse.

3 Mechanism for Reliable Information. The Federal Government, in partnership with the private sector, should explore the best mechanism to provide reliable information (including information regarding the comparative usability of EIT products for people with different types of disabilities) to manufacturers, vendors, and procurement officials.

### Other General Implementation Recommendations

1. Alternative Dispute Resolution. Each agency should establish voluntary alternative dispute resolution mechanisms and make them available to members of the public and employees with disabilities as a means to resolve allegations that an agency is violating section 508.

2. Other Government Certification Programs. Government programs which test and certify software for federal use (such as the JFMIP certification of financial management applications) should incorporate section 508's accessibility requirements into their certification processes [recommendation of the Equal Employment Opportunity Commission].

3. Voluntary Advisory Committees of Persons with Disabilities. Each cabinet level, large, and mid-sized agency that has not already done so should form an intra-agency voluntary advisory committee of persons with disabilities. See General Appendix A (Categories of Agencies). Small and very small agencies are encouraged to form joint inter-agency committees. These committees can assist agencies in recognizing accessibility issues, finding cost-effective solutions, and accomplishing testing. Participation by people with disabilities in all such committees should be fully voluntary. The Equal Employment Opportunity Commission and the Office of Personnel Management should collaboratively publish guidance to assist agencies with setting up these committees.

4. Community Partnerships. Each agency is encouraged to form partnerships with disability rights groups. These partnerships can assist agencies with recognizing accessibility issues, finding solutions, and accomplishing testing.

### Procurement Recommendations

The Department recommends agencies take the following steps to improve their procurement policies and practices:

1. Specific Language for RFPs and Contracts. Each agency should incorporate appropriate procurement language that specifically addresses accessibility for persons with disabilities in all EIT RFP's (requests for proposals) and contracts to be in compliance with the Federal Acquisition Regulation or other applicable federal procurement regulation.

2. Agencies Not Subject to the Federal Acquisition Regulation (FAR). Although most agencies are covered by the FAR, any that is not should consult with the Access Board without delay to ensure that its procurement regulations are appropriately modified to incorporate the Section 508 Standards when they are final.

3. Discontinue Ad Hoc Approach. Each agency that has not already done so should develop systematic ways to ensure that it is procuring accessible EIT products, rather than relying on an ad hoc approach. This method will increase the interoperability of different types of technology and is especially necessary as technology increases in complexity. Each agency should review all of its procurement practices and policies, formal and informal, to determine whether accessibility issues are appropriately addressed.

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[1] This document is available on the Department of Justice's section 508 Web site (www.usdoj.gov/crt/508). People with disabilities may request copies in Braille, large print, or on computer disk by calling 1-800-514-0301 (voice) or 1-800-514-0383 (TTY).

[2] The data underlying the analysis given below appears at Procurement Appendix A. Workforce statistics for weighing the procurement data are set forth in Procurement Appendix B.

[3] For the purposes of analyzing the procurement data, the Department has divided agencies into the following categories:

> Cabinet level agencies and large agencies (large agencies have 10,000+ employees)
>
> Mid-sized agencies (1,000-9,999 employees)
>
> Small agencies (100-999 employees)
>
> Very small agencies (fewer than 100 employees)

[4] Due to the importance of the FAR as a vehicle for compliance with section 508, components' responses to Question 5a will be discussed first.

[5] "With the Board's commitment to the accessibility of the built environment and to electronic and information technology, its own office computer system must be accessible to its entire staff. The Board seeks a contractor that shares this philosophy and is experienced with the use of such technology . . . The Management Approach portion of the technical presentation shall present the Offeror's overall methodology for managing the full range [of] services to be provided under the contract. Areas to be addressed include, at a minimum: Overall approach to meeting the information technology accessibility needs of people with disabilities, including the extent to which the Offeror's solution complies with the requirements for accessible technology as set forth under section 508 of the Rehabilitation Act Amendments of 1998; Experience with assistive and adaptive technologies."

[6] "The Committee considers universal accessibility to information a priority for all employees, including individuals with disabilities. The Committee has adopted the U.S. Department of Education Requirements for Accessible Software Design to support its obligation under Sections 504 and 508 of the Rehabilitation Act of 1973, as amended, to ensure the accessibility of its programs and activities to individuals with disabilities, specifically its obligation to acquire accessible electronic and information technology. When selecting or accepting computer hardware and software applications, the Committee will evaluate the hardware and software to determine its accessibility by users with disabilities according to the version of the U.S. Department of Education's Requirements for Accessible Software Design that is current at the time of contract award."

[7] The Department of Education has developed comprehensive contract language to incorporate its Requirements for Accessible Software Design in EIT contracts for procurement or development of software. Procurement Appendix C.

[8] The Coast Guard's contract for standard desktop workstations includes 3 pages on accessibility requirements. The following is a synopsis of these requirements, as described by the Coast Guard:

> Contractor shall furnish system enhancements as described below to ensure that accessibility requirements are met. System enhancements for hardware and software shall support minimum capabilities as outlined and shall be fully compatible with proposed desktop workstations and software including GUI, applications, and network software. Functional specifications include many options for keyboard enhancements, alternate input devices, voice input systems, large print output displays, speech output systems, and Braille output systems.

[9] Not all responsibilities under sections 501 and 504 of the Rehabilitation Act can be addressed on an ad hoc basis.

[10] Revitalization of the IDCC will enable it to function as a central coordination point to eliminate duplication of efforts and/or inconsistencies among agencies and inter-agency groups.

[11] The Universal Access Working Group is part of the Federal Information Services

Applications Council of the National Science and Technology Council's Committee on Computing, Information, and Communications. It is coordinated through the Center for IT Accommodation in the Office of Governmentwide Policy at the General Services Administration.

*Procurement Appendix A*[1]

## Question-by-Question Results from the Component Questionnaire

1. Does your component use any disability-related language in contracts for electronic and information technology?

   a. Choose the most appropriate answer:

   ____ i. always
   ____ ii. often
   ____ iii. sometimes
   ____ iv. seldom
   ____ v. never

   b. If your component uses any standard disability-related language in your contracts, give the language:

   ________________________________________
   ________________________________________
   ________________________________________
   ________________________________________

Question 1 was designed to determine the frequency of use and quality of agencies' language incorporating disability accessibility issues into EIT procurement contracts. Due to an ambiguity in the question, however, the following data cannot be interpreted as an indication of how many agencies already address disability accessibility in their procurement contracts for EIT. Most of the instances in which agencies cite some language actually refer to general nondiscrimination employment provisions and hiring preferences for disabled veterans.

***Response (a): agencies always incorporating accessibility into mainstream EIT procurement***

Only 22 of 144 components of cabinet level or large agencies (2.9%*) and 1 of 19 components of mid-sized agencies (7.2%*) always incorporate disability-related language into their standard procurement contracts. Two of 21 small agencies (15.9%*) and 2 of 22 very small agencies (4.5%*) also chose this response.

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[1] This document is available on the Department of Justice's section 508 Web site (www.usdoj.gov/crt/508). People with disabilities may request copies in Braille, large print, or on computer disk by calling 1-800-514-0301 (voice) or 1-800-514-0383 (TTY).

***Response (b): agencies* often *incorporating accessibility into mainstream EIT procurement***

Eight of 144 components of cabinet level or large agencies often incorporate disability-related language into their procurement contracts for EIT (2.6%*), while only 2 of 19 mid-sized agencies (7.7%*) do so. Two of 21 small agencies (13.8%*) and 3 of 22 very small agencies (4.8%*) also chose this response.

***Response (c): agencies* sometimes *incorporating accessibility into mainstream EIT procurement***

Twenty-eight of 144 components of cabinet level and large agencies (31.2%*) and 4 of 19 components of mid-sized agencies (13.1%*) responded that they sometimes incorporate accessibility issues into their procurement contracts for EIT. Three of 21 small agencies (10.6%*) and 3 of 22 very small agencies (15.5%*) also chose this response.

***Responses (d) and (e): agencies* seldom *or* never *incorporating accessibility into mainstream EIT procurement***

Ninety-two of 144 components of cabinet level or large agencies (63.3%*) either seldom or never incorporate disability-related language into their procurement contracts for mainstream EIT.

Only 2 of 19 components of mid-sized agencies (9.2%*), 1 of 21 small agencies (2.7%*), and 2 of 22 very small agencies (19%*) indicated that they seldom include disability-related language in their procurement contracts for EIT.

All 10 remaining components of mid-sized agencies (62.7%*), 13 remaining small agencies (57%*), and 12 remaining very small agencies (56.2%*) indicated that they never incorporate disability-related language into their procurement contracts.

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* This is a weighed value measuring the number of full-time employees in these components compared with the total number of persons employed full-time by agencies in this size category.

2. How does your component ensure that acquisition of electronic and information technologies will be conducted in a manner that assures users with disabilities will have equal access to and use of the same data bases, operating systems, application programs, and telecommunication systems as their non-disabled colleagues?

Choose the most appropriate answer:

____ a. My component has an Information Technology ("IT") office that follows an approved reviewing process that meets this objective.

____ b. My component has a reviewing process but no established IT office to meet this objective.

____ c. My component is in the process of approving a draft reviewing process and assigning an IT office to be responsible for the reviews to meet this objective.

____ d. My component is drafting a review process to meet this objective.

____ e. My component addresses this issue on an ad hoc basis.

Good contract language will be meaningless unless there is some mechanism to ensure that contract specifications have been met. Question 2 asks whether agencies have established adequate reviewing processes to ensure that people with disabilities can actually use EIT products that are procured by agencies.

### ***Response “a:” agencies meeting this goal***

Only 17 of 144 components of cabinet level and large agencies (4.1%*) and 2 of 19 components of mid-sized agencies (4.6%*) have Information Technology offices that follow approved reviewing processes to make certain that acquisition of mainstream EIT will be conducted in a manner that ensures that users with disabilities will have equal access to and use of the same data bases, operating systems, applications, and telecommunication systems as other users. Two of 21 small agencies (5.6%*) and 2 of 22 very small agencies (8.6%*) also chose this response.

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* This is a weighed value measuring the number of full-time employees in these components compared with the total number of persons employed full-time by agencies in this size category.

### *Response "b:" agencies using another method to achieve the objective*

Only 12 of 144 components of cabinet level and large agencies (0.7%*) reported that they maintain a reviewing process to ensure acquisition of accessible EIT, but that this reviewing process is not integrated into a mainstream IT office. No small or mid-sized agencies chose answer "b." Only 2 of 22 very small agencies (4.1%*), both agencies' primary focus is on the civil rights of persons with disabilities, chose this response.

### *Response "c:" agencies in the final stages towards meeting this goal*

Only two components of all those surveyed chose response "c" to question 2, representing less than 0.1% of employees of cabinet level and large agencies and 8.8% of employees in very small agencies. At the time of the survey, in other words, few agencies had already drafted reviewing processes that were ready for approval.

### *Response "d:" agencies planning to meet this goal*

Additional agencies reported that they were planning to draft such review processes to address accessibility issues during the acquisition of mainstream EIT products and systems, including 9 of 144 components of cabinet level and large agencies (15.3%*) and 2 of 19 components of mid-sized agencies (13%*). Only one small agency (13.3%*) and one very small agency (5.1%) chose this response.

### *Response "e:" agencies addressing this issue on an ad hoc basis, if at all*

The remaining components responded that they address this issue on an ad hoc basis, if at all. This included 107 of 144 components (79.8%*), 15 of 19 components of mid-sized agencies (82.4%*), 18 of 21 small agencies (81.1%*), and 16 of 22 very small agencies (73.4%*).

Some of these agencies indicate in their overall agency reports that they have standard policies. For example, one agency states that it has the following policy in place: "[Our agency's] offices acquiring information technology resources shall ensure that requirements of employees with disabilities are identified during the analysis of requirements and determination of needs phases of the procurement planning process."

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* This is a weighed value measuring the number of full-time employees in these components compared with the total number of persons employed full-time by agencies in this size category.

3. How does your component identify the requirements of users with disabilities in order to achieve integrated solutions during acquisition planning and procurement?

Choose the most appropriate answer:

____ a. My component has a policy in place to involve users with disabilities or persons knowledgeable about disability access issues in the planning phase of acquisitions to assist in the procurement process by defining requirements and establishing Functional Performance Specifications (FPS) to appropriately describe the desired deliverables and access strategies. My component also involves users with disabilities in the evaluation of proposed solutions.

____ b. My component uses the FPS, however it has not established this as an official policy.

____ c. My component is developing policies and procedures to address this matter.

____ d. My component is reviewing alternative strategies to address this matter, including (explain): ______________________________ ______________________________.

____ e. My component addresses this issue on an ad hoc basis.

Agencies must have guidelines against which they measure an EIT product's accessibility to persons with disabilities. People with disabilities or people with knowledge about disability accessibility issues should be involved in developing these guidelines. Question 3 asks whether agencies have established such guidelines and, if so, whether they consulted with end-users with disabilities or others who are knowledgeable about disability accessibility issues in the process.

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* This is a weighed value measuring the number of full-time employees in these components compared with the total number of persons employed full-time by agencies in this size category.

### *Response "a:" agencies meeting this goal*

Very few components maintain formal policies to involve users with disabilities (or others who are knowledgeable about disability accessibility issues) into the planning phase of EIT acquisitions by involving them when drafting bid specifications and when evaluating submitted EIT products. Only 11 of 144 components of cabinet level and large agencies (0.8%*) already accomplish this goal. No mid-sized or small agencies have formal policies to involve users with disabilities in their procurement processes. Only 2 of 22 very small agencies (4.1%*) maintain such formal policies; both agencies' primary mission is to further the civil rights of persons with disabilities.

### *Response "b:" agencies meeting this goal through informal methods*

Almost an identical number of components reported that they have an informal practice of involving users with disabilities during the earliest stages of EIT acquisition. Six of 144 components of cabinet level and large agencies (1.7%*) reported that they informally involve persons with disabilities into their acquisition of EIT. One mid-sized agency (4.1%*), one small agency (2.6%*), and one very small agency (2.1%*) all reported the same.

### *Response "c:" agencies developing policies to meet this goal*

A few components reported that they are in the process of developing formal policies and procedures to involve users with disabilities into their acquisition of EIT. These include 8 of 144 components of cabinet level and large agencies (0.9%*), 1 mid-sized agency (0.1%*), 1 small agency (13.3%*), and 3 of 22 very small agencies (17.4%*).

### *Response "d:" agencies reviewing alternative strategies to address this matter*

Few components indicated that they are exploring alternative strategies rather than involving users with disabilities in their procurement practices and policies. These include 6 of 144 components of cabinet level and large agencies (1.1%*) and 2 of 21 small agencies (5.4%*).

Some of the alternatives employed by these components include: seeking advice from other components within the same agency or other agencies; using surveys (presumably of users with disabilities) prior to procurement; relying on GSA's compliance with section 508 in its existing contracts; or addressing EIT accessibility issues on a case-by-case basis.

### *Response "e:" agencies addressing this issue on an ad hoc basis*

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* This is a weighed value measuring the number of full-time employees in these components compared with the total number of persons employed full-time by agencies in this size category.

The vast majority of components indicated that they address this issue on an ad hoc basis, if at all. These include 117 of 144 components of cabinet level and large agencies (95.5%*), 17 of 19 components of mid-sized agencies (95.8%*), 17 of 21 small agencies (78.7%*), and 16 of 22 very small agencies (76.4%*).

4. Does your component maintain a list of programs that provide training for management, procurement, and technical personnel on how to meet the accessibility needs of end users with disabilities and the many methods available to meet those requirements?

Choose the most appropriate answer:

____ a. Yes, my component maintains such a list. The list is updated periodically and is made available to all employees.

____ b. No, however, my component is in the process of announcing such a list in the near future.

____ c. No, however, my component is obtaining the information required to develop a list of this nature and the list will be announced when this data gathering is completed.

____ d. No, however, my component has plans to develop such a list.

____ e. No, however, my component is reviewing alternatives to developing such a list.

____ f. No, however, my component identifies appropriate training sources as needed.

A lack of training of management and IT professionals regarding disability accessibility issues can often result in problems for end-users with disabilities. Additionally, mainstream training vendors who are not sufficiently aware of disability accessibility issues may not be able to provide adequate training for users with disabilities, such as where the customer uses keyboard alternatives to "point and click" mouse commands, or where he or she uses the mainstream product in conjunction with assistive technology. Question 4 inquires as to whether agencies have made a list of appropriate training resources.

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* This is a weighed value measuring the number of full-time employees in these components compared with the total number of persons employed full-time by agencies in this size category.

***Response "a:" agencies maintaining lists of accessibility training resources***

Relatively few agencies maintain lists of EIT accessibility training resources for management, procurement, and technical personnel on how to meet the accessibility needs of end users with disabilities. These include 13 of 144 components of cabinet level and large agencies (5.9%*). No mid-sized agencies chose response "a." Only one small agency, representing 3.0% of employees in small agencies, indicated that it maintained a list of EIT accessibility training resources. Likewise, only one very small agency, representing 1.0% of employees in very small agencies, chose this answer.

***Response "b:" agencies announcing such a list in the near future***

Only 1 component of a cabinet level or large agency (0.2%*) indicated it will announce a list of EIT accessibility training resources in the near future.

***Response "c:" agencies gathering information***

Only 5 of 144 components of cabinet level and large agencies (0.4%*) indicated that they are in the process of gathering the information required to develop a list of training resources. No mid-sized or small agencies chose this response. Only 2 very small agencies indicated that they are in the process of gathering information to develop such a list (13.9%*).

***Response "d:" agencies planning to develop such a list***

Relatively few agencies have plans to develop a list of EIT accessibility training resources. These include 4 of 144 components of cabinet level and large agencies (1.1%*), 1 component of a mid-sized agency (0.1%*), and 1 small agency (13.3%*). None of the very small agencies has a plan to develop such a list.

***Response "e:" agencies reviewing alternatives to developing such a list***

A small number of agencies are reviewing alternatives to developing a list of EIT accessibility training resources. These include 5 of 144 components of cabinet level and large agencies (15.4%*), no mid-sized or small agencies, and only 1 very small agency (0.7%).

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* This is a weighed value measuring the number of full-time employees in these components compared with the total number of persons employed full-time by agencies in this size category.

***Response "f:" agencies identifying appropriate training sources only when needed***

Almost all agencies maintain a reactive posture and identify appropriate training resources only when needed. These include 121 of 144 components of cabinet level and large agencies (77%*), 18 of 19 mid-sized agencies (99.9%*), 19 of 21 small agencies (83.7%*), and 18 of 22 very small agencies (84.4%*).

5a. Are your agency's acquisitions subject to the Federal Acquisition Regulation (FAR)?

Choose the most appropriate answer:

___ a. Yes. Our agency's acquisitions are subject to FAR.

___ b. Our agency's acquisitions are not governed by FAR, but we use it (formally or informally) as guidance for procurement policies and procedures.

___ c. No. Our agency has established policies and procedures that are independent of the FAR.

The Access Board's section 508 standards will be incorporated into the Federal Acquisition Regulation (FAR). Agencies complying with the FAR will, accordingly, automatically have the section 508 standards incorporated into the procurement mechanisms. Agencies which do not follow the FAR will have to independently modify their procurement policies and procedures to incorporate the section 508 standards. Question 5a asks agencies to identify whether they follow the FAR.

***Response "a:" agencies covered by the FAR***

Most agencies in all size categories are covered by the Federal Acquisition Regulation (FAR). These include 138 of 144 components of cabinet level and large agencies (79.2%*), 16 of 19 components of mid-sized agencies (79.4%*), 18 of 21 small agencies (92.2%*), and 18 of 22 very small agencies (85.7%*).

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* This is a weighed value measuring the number of full-time employees in these components compared with the total number of persons employed full-time by agencies in this size category.

### *Response "b:" non-FAR agencies using the FAR for policy guidance*

About half of the agencies that are not required to follow the FAR use it for policy guidance. These include 1 component of a cabinet level or large agency (less than 0.1%*), 2 mid-sized agencies (5.5%*), 3 small agencies (7.8%*), and 2 very small agencies (8.2%).

### *Response "c:" non-FAR agencies not using the FAR for guidance*

The remaining agency and components are not required to follow the FAR and do not use it for policy guidance. These include 5 of 144 components of cabinet level or large agencies (20.8%*), 1 mid-sized agency (15.1%*), no small agencies, and 2 very small agencies (6.1%*).

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* This is a weighed value measuring the number of full-time employees in these components compared with the total number of persons employed full-time by agencies in this size category.

5b. If your agency's acquisitions follow the FAR (formally or informally), has your component established a strategic plan for meeting its electronic and information technology needs -- including, among other things, accommodations for individuals with disabilities -- pursuant to OMB Circular A-130, as required by section 39.101 of the FAR?

____ a. Yes, my component has an established strategic plan which addresses accessibility issues, that has been approved and distributed to all appropriate offices. Prior to the acquisition of any electronic and information technology the RFP's are reviewed for compliance.

____ b. Yes, my component has an established strategic plan which addresses accessibility issues but there is no review process to ensure that RFP's are in compliance.

____ c. No, however, my component does have a draft strategic plan that will meet the stated objectives when approved.

____ d. No, however, my component is developing and drafting a strategic plan which will meet the stated objectives.

____ e. No, however, my component is in the process of defining its electronic and information technology needs and, when this is defined, accessibility guidelines will be addressed.

____ f. No, however, even though my component does not have a strategic plan, we address accessibility issues on an ad hoc basis.

___ g. Not applicable. Our agency's acquisitions are not subject to FAR.

For many years, the FAR has incorporated by reference some general language requiring agencies to incorporate disability accessibility issues into their strategic plans regarding

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* This is a weighed value measuring the number of full-time employees in these components compared with the total number of persons employed full-time by agencies in this size category.

procurement of mainstream information technology. Question 5b asks agencies whether they have been complying with these requirements.

### *Response "a:" agencies maintaining a strategic plan that includes reviewing the accessibility of EIT products before acquisition*

Of the agencies required to comply or voluntarily complying with the FAR (FAR agencies), comparatively few tend to maintain a strategic plan that includes reviewing the accessibility of EIT products before acquisition. This includes 14 of 144 components of cabinet level or large agencies (3.3%*), no mid-sized agencies, only 2 of 21 small agencies (5.8%*), and 2 of 22 very small agencies (12.9%*).

### *Response "b:" agencies maintaining a strategic plan to meet the EIT needs of persons with disabilities, but without any review process in place*

Comparatively more large FAR agencies maintain strategic plans to meet the EIT needs of persons with disabilities but do not have any type of formal review process in place to determine whether EIT products submitted for procurement actually meet the bid requirements. Ten of 144 components of cabinet level and other large agencies (1.6%*) chose response "b," compared with no mid-sized or small agencies, and, in the very small agency category, only 1 of 22 agencies (3.5%).

### *Response "c:" agencies reviewing a draft strategic plan to meet this goal*

Very few FAR agencies of any size have already drafted and are about to review a strategic plan to incorporate the EIT needs of persons with disabilities. Only 2 of 144 components of cabinet level agencies chose this response (0.1%*). No mid-sized or small agencies chose this response. One of 22 very small agencies (9.3%*), indicated that it was reviewing a draft strategic plan to integrate EIT needs of persons with disabilities into its mainstream EIT acquisition processes.

### *Response "d:" agencies developing a strategic plan to meet this objective*

More FAR agencies plan to develop a strategic plan to meet this objective, including 14 of 144 components of cabinet level and large agencies (20.1%*) and 3 of 19 components of mid-sized agencies (20.3%*). One agency in each of the small (3.0%) and very small (5.1%*) agency categories chose this response.

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* This is a weighed value measuring the number of full-time employees in these components compared with the total number of persons employed full-time by agencies in this size category.

### *Response "e:" agencies in the initial stages of defining EIT needs*

Relatively more of the smaller FAR agencies are in the initial stages of defining their EIT needs as they relate to persons with disabilities than is true of the larger FAR agencies. Fifteen of 144 components of cabinet level and very large agencies (15.3%*) and 2 of 19 components of mid-sized agencies (8.5%), compared with 7 of 21 small agencies (47.5%*) and 4 of 22 very small agencies (21.3%*).

### *Response "f:" agencies addressing accessibility issues on an ad hoc basis, with no strategic plan*

Close to half of the FAR agencies participating in this survey address EIT accessibility issues on an ad hoc basis, with no strategic plan, contrary to the FAR's requirements. These include 87 of 144 components of cabinet level and large agencies (59.6%*), 13 of 19 components of mid-sized agencies (56.1%*), 10 of 21 small agencies (42.2%*), and 11 of 22 very small agencies (47.9%*).

### *Response "g:" agencies which are not required by the FAR to establish a strategic plan*

The remaining agencies are not required by the FAR to maintain a strategic plan that incorporates the needs of persons with disabilities, nor do they look to the FAR on a voluntary basis for policy guidance.

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* This is a weighed value measuring the number of full-time employees in these components compared with the total number of persons employed full-time by agencies in this size category.

*Procurement Appendix B*[1]

## Workforce Statistics for Weighing Procurement Data

**Cabinet Level Agencies and Large Agencies** ("Large Agencies" have 10,000+ employees)

| Agency | Component | Number of full-time employees counted in component's procurement data | Percentage of "Cabinet Level and Large Agencies" for Procurement |
|---|---|---|---|
| **Dept. of Agriculture** | Agricultural Marketing Service, Science & Technology, IT, PPA | 4299 | 0.1098 |
| | Agricultural Research Service, Administrative & Financial Management | 8167 | 0.2085 |
| | Animal and Plant Health Inspection Service | 6461 | 0.1649 |
| | Departmental Administration | 701 | 0.0179 |
| | Economic Research Service | 533 | 0.0136 |
| | Farm Service Agency | 7290 | 0.1861 |
| | Food and Nutrition Service | 1717 | 0.0438 |
| | Food Safety Inspection Service | 9702 | 0.2477 |
| | Forest Service | 34,984 | 0.8931 |
| | National Agricultural Statistical Service | 1140 | 0.0291 |
| | Natural Resources Conservation Service | 11466 | 0.2927 |
| | Office of Civil Rights | [component's procurement data deleted as duplicative of data from Departmental Administration, upon instruction from agency] | 0.0000 |
| | Overall Development/Operations and Management | 7139 | 0.1823 |

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[1] This document is available on the Department of Justice's section 508 Web site (www.usdoj.gov/crt/508). People with disabilities may request copies in Braille, large print, or on computer disk by calling 1-800-514-0301 (voice) or 1-800-514-0383 (TTY).

| Agency | Component | Number of full-time employees counted in component's procurement data | Percentage of "Cabinet Level and Large Agencies" for Procurement |
|---|---|---|---|
| **Dept. of Commerce** | National Institute of Standards and Technology | 3,666 | 0.0936 |
| | National Oceanic and Atmospheric Administration | 15,540 | 0.3967 |
| | U.S. Patent & Trademark Office | 6,345 | 0.1620 |
| | Bureau of the Census | 17,508 | 0.4470 |
| **Dept. of Defense** | Air Force Communications Agency | 534600 | 13.6481 |
| | Defense Advanced Research Projects Agency | 134 | 0.0034 |
| | Defense Contract Audit Agency | 3986 | 0.1018 |
| | Defense Finance and Accounting Service | 8310 | 0.2122 |
| | Defense Finance and Accounting Service Cleveland Center | [component's procurement data deleted as duplicative of data from DFAS, upon instruction from agency] | 0.0000 |
| | Defense Information Systems Agency | 6143 | 0.1568 |
| | Defense Logistics Agency | 39778 | 1.0155 |
| | Defense Manpower Data Center | 553 | 0.0141 |
| | Department of Defense, Civilian Personnel Management Service | [component's procurement data deleted as duplicative of data from WHS, upon instruction from agency] | 0.0000 |
| | Department of the Navy, Office of the Chief Information Officer | 751400 | 19.1829 |
| | National Imagery and Mapping Agency | [the number of employees is classified] | 0.0000 |
| | Office of the Secretary of the Army, OSDIC4 | 705900 | 18.0213 |
| | Washington Headquarters Services, DIOR/S&S | 1498 | 0.0382 |
| **Dept. of Education** | Agency-wide response | 5200 | 0.1328 |
| **Dept. of Energy** | Bechtel Nevada | 300 | 0.0077 |

| Agency | Component | Number of full-time employees counted in component's procurement data | Percentage of "Cabinet Level and Large Agencies" for Procurement |
|---|---|---|---|
|  | Brookhaven National Laboratory | [no employment figures were provided by agency] | 0.0000 |
|  | Department Of Energy Headquarters | 11,300 | 0.2885 |
| **Dept. of Health and Human Services** | Administration for Children and Families | 1494 | 0.0381 |
|  | Centers for Disease Control and Prevention | 7090 | 0.1810 |
|  | Food And Drug Administration | 8315 | 0.2123 |
|  | Health Care Financing Administration | 4310 | 0.1100 |
|  | Health Resources and Services Administration | 1910 | 0.0488 |
|  | Indian Health Service | 13,388 | 0.3418 |
|  | National Institute of Health | 12,931 | 0.3301 |
|  | Office of the Secretary | 2748 | 0.0702 |
|  | Program Support Center | 1036 | 0.0264 |
|  | Substance Abuse [illegible] Mental Health Services Administration | 608 | 0.0155 |
| **Dept. of Housing and Urban Development** | Agency-wide response | 10,051 | 0.2566 |

| Agency | Component | Number of full-time employees counted in component's procurement data | Percentage of "Cabinet Level and Large Agencies" for Procurement |
|---|---|---|---|
| **Dept. of Interior** | Bureau of Indian Affairs | 9343 | 0.2385 |
| | Bureau of Land Management | 9841 | 0.2512 |
| | Management Office of Small and Disadvantaged Business Utilization | 1075 | 0.0274 |
| | Office of the Special Trustee/Office of Trust Funds Management | 312 | 0.0080 |
| | Office of Surface Mining Reclamation and Enforcement | 645 | 0.0165 |
| | U.S. Fish And Wildlife Service | 8117 | 0.2072 |
| | U.S. Geological Survey | 9482 | 0.2421 |
| | Bureau of Reclamation | 5786 | 0.1477 |
| | Minerals Management Service | 1745 | 0.0445 |
| | National Business Center, Division of Acquisition Services | [component's procurement data was deleted as duplicative of NBC, Products and Services, upon instruction from agency] | 0.0000 |
| | National Business Center, Products and Services | 286 | 0.0073 |
| | National Park Service | 19,918 | 0.5085 |
| | Office of Hearings and Appeals | [component's procurement data deleted as duplicative of data from Management Office of Small and Disadvantaged Business Utilization, upon instruction from agency] | 0.0000 |
| | Office of Information Resources Management | [component's procurement data deleted as duplicative of data from Management Office of Small and Disadvantaged Business Utilization, upon instruction from agency] | 0.0000 |
| | Office of Inspector General | 238 | 0.0061 |
| | Office of the Secretary/Policy, Management & Budget/Planning & Performance | [component's procurement data deleted as duplicative of data from Management Office of Small and Disadvantaged Business Utilization, upon instruction from agency] | 0.0000 |
| **Dept. of Justice** | Antitrust Division | 586 | 0.0150 |

| Agency | Component | Number of full-time employees counted in component's procurement data | Percentage of "Cabinet Level and Large Agencies" for Procurement |
|---|---|---|---|
| | Civil Division | 1,003 | 0.0256 |
| | Civil Rights Division | 522 | 0.0133 |
| | Criminal Division | 758 | 0.0194 |
| | Drug Enforcement Administration | 8,734 | 0.2230 |
| | Environment and Natural Resources Division | 603 | 0.0154 |
| | Executive Office for Immigration Review | 964 | 0.0246 |
| | Executive Office for United States Attorneys | 9,444 | 0.2411 |
| | Executive Office for United States Trustees | 1,023 | 0.0261 |
| | Federal Bureau of Prisons | 30,927 | 0.7896 |
| | Immigration And Naturalization Service | 28,934 | 0.7387 |
| | Interpol - United States National Central Bureau | 63 | 0.0016 |
| | Justice Management Division, Information Management and Security Staff | 2173 | 0.0555 |
| | Office of the Inspector General | 395 | 0.0101 |
| | Office of Justice Programs | 780 | 0.0199 |
| | Office of the Pardon Attorney | 15 | 0.0004 |
| | Office of the Solicitor General | 43 | 0.0011 |
| | Tax Division | 543 | 0.0139 |
| | United States Marshals Service | 3,990 | 0.1019 |
| | U.S. Parole Commission | 72 | 0.0018 |
| **Dept. of Labor** | Employment and Training Administration/Office of Technology | 850 | 0.0217 |
| | Employment Standards Administration | 4021 | 0.1027 |
| | Mine Safety and Health Administration | 2206 | 0.0563 |
| | Pension Welfare Benefits Administration | 762 | 0.0195 |

| Agency | Component | Number of full-time employees counted in component's procurement data | Percentage of "Cabinet Level and Large Agencies" for Procurement |
|---|---|---|---|
|  | Office of the Assistant Secretary for Administration and Management | 2598 | 0.0663 |
|  | Office of the Inspector General | 420 | 0.0107 |
|  | Occupational Safety and Health Administration | 2263 | 0.0578 |
|  | Bureau of Labor Statistics | 3000 | 0.0766 |
| **Dept. of State** | United States Information Agency | 6352 | 0.1622 |
|  | AF/EX | 35 | 0.0009 |
|  | Office of International Organizations | 141 | 0.0036 |
|  | Bureau of Economics and Business Affairs | 180 | 0.0046 |
|  | Bureau of Population, Refugees, and Migration | 88 | 0.0022 |
|  | Bureau of East Asian and Pacific Affairs | 200 | 0.0051 |
|  | Office of the Legal Adviser | 202 | 0.0052 |
|  | Bureau of European Affairs | 250 | 0.0064 |
|  | Bureau of Oceans and International Environmental and Scientific Affairs | 159 | 0.0041 |
|  | Office of Inspector General | 300 | 0.0077 |
|  | Bureau of Financial Management and Policy | 548 | 0.0140 |
|  | Arms Control Bureau | 250 | 0.0064 |
|  | Foreign Service Institute | 550 | 0.0140 |
|  | S/S-IRM Office of Secretariat Systems | 526 | 0.0134 |
|  | Office of Humanitarian Demining Programs | 12 | 0.0003 |
|  | Bureau of Diplomatic Security | 1300 | 0.0332 |
| **Dept. of Transportation** | National Highway Traffic Safety Administration | 606 | 0.0155 |
|  | Federal Highway Administration | 2,900 | 0.0740 |

| Agency | Component | Number of full-time employees counted in component's procurement data | Percentage of "Cabinet Level and Large Agencies" for Procurement |
|---|---|---|---|
| | Research and Special Programs Administration | 867 | 0.0221 |
| | Transportation Administrative Service Center | 857 | 0.0219 |
| | Federal Transit Administration | 495 | 0.0126 |
| | United States Coast Guard | 89,000 | 2.2721 |
| | Federal Railroad Administration | 729 | 0.0186 |
| | Federal Aviation Administration | 49,459 | 1.2627 |
| | Maritime Administration | 967 | 0.0247 |
| | Office of the Secretary | 664 | 0.0170 |
| **Dept. of Treasury** | Bureau of the Public Debt | 1,840 | 0.0470 |
| | Federal Law Enforcement Training Center | 545 | 0.0139 |
| | U.S. Secret Service | 4,908 | 0.1253 |
| | Financial Management Service | 2,122 | 0.0542 |
| | Office of the Comptroller of the Currency | 2,945 | 0.0752 |
| | Bureau of Alcohol, Tobacco, and Firearms | 4,033 | 0.1030 |
| | Office of Thrift Supervision | 1,251 | 0.0319 |
| | IRS | 113,720 | 2.9032 |
| | Office of Inspector General | 277 | 0.0071 |
| | Departmental Offices | 1,532 | 0.0391 |
| | U.S. Mint | 2,095 | 0.0535 |
| | Bureau of Engraving and Printing | 2,558 | 0.0653 |
| | U.S. Customs Service | 20,593 | 0.5257 |
| **Dept. of Veterans' Affairs** | Dep. Asst Sec for Acq. and Materiel Management, Business Office (91A) | 180,000 | 4.5953 |
| | Asst Sec for I&T, Austin Automation Center | 60,000 | 1.5318 |
| **Environmental Protection Agency** | Office of Policy | 291 | 0.0074 |

| Agency | Component | Number of full-time employees counted in component's procurement data | Percentage of "Cabinet Level and Large Agencies" for Procurement |
|---|---|---|---|
|  | Office of Research and Development | 1976 | 0.0504 |
|  | Region 1 | 733 | 0.0187 |
|  | Region 2 | 956 | 0.0244 |
|  | Region 3 | 944 | 0.0241 |
|  | Region 7 | 580 | 0.0148 |
| **Executive Office of the President** | Agency-wide response | 1510 | 0.0386 |
| **General Services Administration** | Agency-wide response | 14,500 | 0.3702 |
| **National Aeronautics and Space Administration** | John C. Stennis Space Center | 258 | 0.0066 |
|  | Dryden Flight Research Center | 602 | 0.0154 |
|  | Goddard Space Flight Center | 3000 | 0.0766 |
|  | John H. Glenn Research Center at Lewis Field | 2019 | 0.0515 |
|  | Headquarters | 968 | 0.0247 |
|  | Ames Research Center | 1465 | 0.0374 |
|  | Lyndon B. Johnson Space Center | 2980 | 0.0761 |
|  | NASA Langley Research Center | 2273 | 0.0580 |
|  | John F. Kennedy Space Center | 1729 | 0.0441 |
|  | George C. Marshall Space Flight Center | 2564 | 0.0655 |
| **Social Security Administration** | Agency-wide response | 64,000 | 1.6339 |
| **Tennessee Valley Authority** | Agency-wide response | 13,500 | 0.3446 |
| **United States Postal Service** | Agency-wide response | 800,000 | 20.4237 |

**Mid-Sized Agencies** (1000-9,999 employees)

| Agency | Component | Number of full-time employees counted in component's procurement data | Percentage of "Mid-Sized Agencies" for Procurement |
|---|---|---|---|
| **Agency for Int'l Development** | Agency-wide response | 7289 | 14.9 |
| **Equal Employment Opportunity Commission** | Agency-wide response | 2850 | 5.8 |
| **Federal Communications Commission** | Agency-wide response | 2000 | 4.1 |
| **Federal Deposit Insurance Corporation** | Agency-wide response | 7387 | 15.1 |
| **Federal Emergency Management Agency** | Agency-wide response | 2210 | 4.5 |
| **Federal Reserve Board** | Agency-wide response | 1700 | 3.5 |
| **Federal Trade Commission** | Agency-wide response | 1135 | 2.3 |
| **National Archives and Records Administration** | Agency-wide response | 3200 | 6.5 |
| **National Credit Union Administration** | Agency-wide response | 1000 | 2.0 |
| **National Labor Relations Board** | Agency-wide response | 1900 | 3.9 |
| **National Science Foundation** | Agency-wide response | 1300 | 2.7 |
| **Nuclear Regulatory Commission** | Agency-wide response | 2800 | 5.7 |
| **Office of Personnel Management** | Agency-wide response | 3200 | 6.5 |
| **Pension Benefit Guaranty Corporation** | Agency-wide response | 1450 | 3.0 |

| Agency | Component | Number of full-time employees counted in component's procurement data | Percentage of "Mid-Sized Agencies" for Procurement |
|---|---|---|---|
| **Railroad Retirement Board** | Agency-wide response | 1196 | 2.4 |
| **Securities and Exchange Commission** | Agency-wide response | 3500 | 7.2 |
| **Small Business Administration** | Business Information Centers | 50 | 0.1 |
|  | Office of the CIO | 67 | 0.1 |
|  | Senior Acquisitions | 4,700 | 9.6 |

**Small Agencies** (100-999 employees)

| Agency | Number of full-time employees counted in component's procurement data | Percentage of "Small Agencies" for Procurement |
|---|---|---|
| **Commodity Futures Trading Commission** | 550 | 8.4 |
| **Consumer Product Safety Commission** | 478 | 7.3 |
| **Corporation for National and Community Service** | 600 | 9.1 |
| **Defense Nuclear Facilities Safety Board** | 104 | 1.6 |
| **Export-Import Bank of the United States** | 400 | 6.1 |
| **Farm Credit Administration** | 300 | 4.6 |
| **Federal Election Commission** | 351 | 5.4 |
| **Federal Housing Finance Board** | 110 | 1.7 |
| **Federal Labor Relations Authority** | 211 | 3.2 |
| **Federal Maritime Commission** | 138 | 2.1 |
| **Federal Mediation and Conciliation Service** | 200 | 3.0 |
| **Federal Retirement Thrift Investment Board** | 100 | 1.5 |
| **International Trade Commission** | 400 | 6.1 |
| **Merit Systems Protection Board** | 240 | 3.7 |
| **National Endowment for the Arts** | 160 | 2.4 |
| **National Endowment for the Humanities** | 175 | 2.7 |
| **National Transportation Safety Board** | 402 | 6.1 |
| **Overseas Private Investment Corporation** | 200 | 3.0 |
| **Peace Corps**[2] | 870 | 13.3 |
| **Selective Service System** | 170 | 2.6 |
| **United States Holocaust Memorial Museum** | 400 | 6.1 |

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[2] The Peace Corps also has approximately 6,700 volunteers. For calculation purposes, and consistent with instructions from the agency, volunteers were not included in the total number of "employees" of the Peace Corps, as they typically are in the field and do not have access to EIT to which section 508 pertains.

**Very Small Agencies** (fewer than 100 employees)

| Agency | Number of full-time employees counted in component's procurement data | Percentage of "Very Small Agencies" for Procurement |
|---|---|---|
| Advisory Council on Historic Preservation | 34 | 3.5 |
| African Development Foundation | 33 | 3.4 |
| American Battle Monuments Commission | 51 | 5.3 |
| Architectural and Transportation Barriers Compliance Board ("Access Board") | 30 | 3.1 |
| Commission on Civil Rights | 90 | 9.3 |
| Commission on Fine Arts | 7 | 0.7 |
| Committee for Purchase for People Who are Blind or Severely Disabled | 20 | 2.1 |
| Federal Mine Safety and Health Review Commission | 50 | 5.1 |
| Institute of Museum and Library Services | 40 | 4.1 |
| Inter-American Foundation | 65 | 6.7 |
| Japan-U.S. Friendship Commission | 4 | 0.4 |
| Marine Mammal Commission | 10 | 1.0 |
| National Capital Planning Commission | 50 | 5.1 |
| National Commission on Libraries and Information Science | 7 | 0.7 |
| National Council on Disability | 10 | 1.0 |
| National Mediation Board | 50 | 5.1 |
| Occupational and Safety and Health Review Commission | 70 | 7.2 |
| Office of Government Ethics | 85 | 8.8 |
| Office of Navajo and Hopi Relocation | 65 | 6.7 |
| Office of Special Counsel | 95 | 9.8 |
| Postal Rate Commission | 55 | 5.7 |
| Trade and Development Agency | 50 | 5.1 |

*Procurement Appendix C*[1]

## The Department of Education's Contract Language

The Department of Education's EIT contract language incorporates accessibility to persons with disabilities, in relevant part, as follows:

> The Department of Education (ED) considers universal accessibility to information a priority for all its employees and external customers, including individuals with disabilities. Under Section 504 and 508 of the Rehabilitation Act of 1973 (29 U.S.C. sections 794 and 794d, as amended), ED must ensure the accessibility of its programs and activities, specifically its obligation to acquire and use accessible electronic and information technology. ED maintains the manual, "Requirements for Accessible Software Design," to convey the accessibility needs of the Department to developers and suppliers of computer applications. To comply with the provisions of this clause, the contractor may use the edition of the ED manual "Requirements for Accessible Software Design" in effect at the date of award of this contract or any more recent edition. A copy of the most recent edition of the manual may be found at http://ocfo.ed.gov/coninfo/clibrary/software.htm.
>
> (a) Software developed for ED--The contractor shall ensure that any software developed under this contract for use by ED's employees or external customers are accessible to individuals with disabilities. At a minimum, such software must meet all the requirements of the ED manual "Requirements for Accessible Software Design." However, in accordance with paragraph (d) of this clause, the contracting officer may waive a particular requirement.
>
> (b) Software enhanced or modified for ED--Any enhancements and other modifications, made under this contract software for use by ED's employees or external customers, are subject to the requirements of paragraph (a) of this clause, regardless of where or how the software was first developed. Except as otherwise specified elsewhere in the contract schedule, the contractor is only required to ensure that enhancement or modifications (not other features or parts of the software) of the software fully comply with the accessibility requirements of paragraph (a), as well as suggest solutions to ensure the software complies.
>
> (c) Other software delivered under this contract--The contractor shall consider accessibility to individuals with disabilities as a significant factor when selecting or purchasing any software that will be delivered under this contract for use by ED's

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employees or external customers.

The Department of Education's contract language as submitted to the Department of Justice also included references to waivers, schedules for examination periods, and other clauses that will likely be superceeded when the standards implementing section 508 are rolled into the FAR.

*General Appendix A*[1]

## Categories of Agencies

### Cabinet Level Agencies and Departments

Executive Office of the President
Dept. of Agriculture
Dept. of Commerce
Dept. of Defense
Dept. of Education
Dept. of Energy
Dept. of Health and Human Services
Dept. of Housing and Urban Development
Dept. of Interior
Dept. of Justice
Dept. of Labor
Dept. of State
Dept. of Transportation
Dept. of Treasury
Dept. of Veterans' Affairs

### Large Agencies (10,000+ employees)

Environmental Protection Agency (18,807)
General Services Administration (14,500)
National Aeronautics and Space Administration (17,710)
Social Security Administration (64,000)
Tennessee Valley Authority (13,500)
United States Postal Service (800,000)

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**Mid-Sized Agencies (1000-9,999 employees)**

Agency for Int'l Development (7289)
Equal Employment Opportunity Commission (2850)
Federal Communications Commission (2000)
Federal Deposit Insurance Corporation (7387)
Federal Emergency Management Agency (2210)
Federal Reserve Board (1700)
Federal Trade Commission (1135)
National Archives and Records Administration (3200)
National Credit Union Administration (1000)
National Labor Relations Board (1900)
National Science Foundation (1300)
Nuclear Regulatory Commission (2800)
Office of Personnel Management (3200)
Pension Benefit Guaranty Corporation (1450)
Railroad Retirement Board (1196)
Securities and Exchange Commission (3500)
Small Business Administration (3200)

**Small Agencies (100-999 employees)**

Commodity Futures Trading Commission (500-600)
Consumer Product Safety Commission (478)
Corporation for National and Community Service (600)
Defense Nuclear Facilities Safety Board (104)
Export-Import Bank of the United States (400)
Farm Credit Administration (300)
Federal Election Commission (335)
Federal Housing Finance Board (110)
Federal Labor Relations Authority (211)
Federal Maritime Commission (138)
Federal Mediation and Conciliation Service (200)
Federal Retirement Thrift Investment Board (just over 100 employees)
International Trade Commission (400)
Merit Systems Protection Board (240) (not done)
National Endowment for the Arts (160)
National Endowment for the Humanities (175)
National Transportation Safety Board (402)
Overseas Private Investment Corporation (200)
Peace Corps (870 employees, 6700 volunteers)
Selective Service System (170)
United States Holocaust Memorial Museum (400)

### Very Small Agencies (Fewer than 100 employees)

Advisory Council on Historic Preservation (34)
African Development Foundation (33)
American Battle Monuments Commission (51) (not done)
Architectural and Transportation Barriers Compliance Board ("Access Board") (30)
Commission on Civil Rights (90)
Commission on Fine Arts (7)
Committee for Purchase for People Who are Blind or Severely Disabled (20)
Federal Mine Safety and Health Review Commission (50)
Institute of Museum and Library Services (40)
Inter-American Foundation (65 employees)
Japan-U.S. Friendship Commission (4)
Marine Mammal Commission (10)
National Capital Planning Commission (50)
National Commission on Libraries and Information Science (7)
National Council on Disability (10)
National Mediation Board (50)
Occupational and Safety and Health Review Commission (70)
Office of Government Ethics (85)
Office of Navajo and Hopi Relocation (65)
Office of Special Counsel (95)
Postal Rate Commission (55)
Trade and Development Agency (50)

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